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ABSTRACT

These proceedings consist of the following eight papers: "Vocational Training in Brazil--Aspects of Economic Policy and Planning," by Gustav Schachter "Economic Stabilization and Medium Term Development Strategy in Brazil," by Peter T. Knight; "Training and Development," by Manuel Zymelman; "The Organization of the Brazilian System," by Morris A. Horowitz; "Evaluation of Current Vocational Training in Progress in Brazil," by Antonio Ferreira de Andrade, Eloysio Rodriguez da Silva, and Francisco Jose Abreu; "Structural Characteristics of Manpower and SENAC's Role in Brazil," by Roberto Carlos Regnier Neto; "Some Statistical Interpretation of Vocational Education in Brazil," by Paul Ammann and Gustav Schachter; and "The Labor Market Impacts of Vocational Education Programs in the United States," by Andrew Sum. (MN)

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Vocational Education
Aspects of Economic Policy & Planning

Proceedings of the Conference at
Northeastern University
June 11-12, 1984

Edited by
Gustav Schachter

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VOCATIONAL EDUCATION IN BRAZIL
ASPECTS OF ECONOMIC POLICY AND PLANNING

Proceedings of the Conference Held
at Northeastern University
June 11-12, 1984

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TABLE OF CONTENTS

Contributors i

CHAPTER 1
Vocational Training in Brazil—Aspects of Economic Policy and Planning
Gustav Schachter 1

CHAPTER 2
Economic Stabilization and Medium Term Development Strategy in Brazil
Peter T. Knight 9

CHAPTER 3
Training and Development
Manuel Zymelman 30

CHAPTER 4
The Organization of the Brazilian System
Morris A. Horowitz 39

CHAPTER 5
Evaluation of Current Vocational Training in Progress in Brazil
Antonio Ferreira de Andrade, Eloysio Rodriguez da Silva, and Francisco Jose Abreu 45

CHAPTER 6
Structural Characteristics of Manpower and SENAC's Role in Brazil
Roberto Carlos Regnier Neto 67

CHAPTER 7
Some Statistical Interpretation of Vocational Education in Brazil
Paul Ammann and Gustav Schachter 85

CHAPTER 8
The Labor Market Impacts of Vocational Education Programs in the United States
Andrew Sum 113

Program 146

CHAPTER 1

VOCATIONAL TRAINING IN BRAZIL- ASPECTS OF ECONOMIC POLICY AND PLANNING

by
Gustav Schachter

Vocational education remains a foundation on which development can take place in countries that have large pools of underutilized human resources. Development, in the sense taken here, is aimed at changing not only the rate of economic expansion but also the structure of the economy. The largest and the most important resource--often the only plentiful one in most Latin American countries--is people. Usually people can produce more than they consume, but only if they are prepared to assume productive tasks and have tools available for these tasks. Economic expansion requires both inert capital (the tools) and human capital (trained workers). Such capital can be acquired only when a country does not have to use its entire production for consumption. This is the problem confronting developing countries: to achieve their goals, they need the products of those goals. Still, it is possible to resolve the problem. Although initially it is most difficult to accumulate inert capital, it is possible to accumulate "human capital" through widespread educational training programs.

To implement training programs effectively is not easy. The number of programs needed and their structure must be carefully planned. The development of a program takes time as does evaluating its effectiveness. Before any program is put into effect, then, there must be a careful assessment of the manpower and training needs of various sectors and there must be a clearly articulated manpower policy.

To plan a training program that is responsive to sectoral employment demands, one could use planning tools available for economic planning without many sophisticated statistical techniques. A planning tool that can be utilized is the input-output technique. This technique is demand oriented; that is, the manipulation of sectoral final demand vectors indicates what direct and indirect changes can ensue for each sector. The availablility of cross sector-occupation and occupation-education matrices allows one to determine the necessary changes in sectoral output and ultimately in educational training qualifications that the labor force will need to satisfy that output. This technique is similar to that proposed for less developed countries by Horowitz et. al. in their book Manpower Requirements for Planning and for the Italian regions by Schachter et. al. in their book Manpower Planning for the Italian Regions.

All of these issues were the subject of a recent seminar at Northeastern University. The catalyst for organizing the seminar was the recent economic crisis in Brazil, the 1980 Report by Northeastern Professors Morris A. Horowitz and Gustav Schachter, evaluating the

country's vocational training system, and the presence of Paul Ammann of the Brazilian Ministry of Labor at Northeastern University during the academic year 1983-84. A research and development grant received from Northeastern University for "Vocational Training in Brazil" made it appropriate for the University to sponsor a seminar on the problems of vocational training in Brazil. The seminar was made possible when Solveig Turner, Director of CIHED, accepted responsibility for its organization, and it was subsequently held in June 1984.

The purpose of this seminar was to create an opportunity for Brazilian representatives in the field of vocational training and experts in this area from local and international institutions to exchange ideas on the development and planning of such training. Participants included representatives from the Brazilian Ministry of Labor, National Service for Industrial Apprenticeship (SENAI), National Service for Commercial Apprenticeship (SENAC), the International Bank of Reconstruction and Development (the World Bank), the Inter American Development Bank, and many universities in the Boston area.

In the following chapters, we have brought together the formal presentations of many participants as they were given at the June seminar. Our purpose was to make available to policy makers and to researchers who are interested in the process of economic policy and vocational training in Brazil, the ideas and views that surfaced during the seminar.

These ideas and views varied somewhat as did the areas studied. Thus our conference proceedings begin with a chapter on the strategy for economic stabilization and development in Brazil by Peter J. Knight. It is Knight's contention that the rapid and sustained growth of Brazil's economy prior to the 1970's was based on cheap energy and low cost of foreign capital. Given the OPEC readjustment in 1973/74 as well as the one in 1979 together with high real rates of interest, the vigorous Brazilian economic expansion ended by the beginning of the 1980's. The new structure of inputs, therefore, requires a new strategy for development.

According to Knight, the medium-term objective for Brazil should be economic growth that will increase employment, decrease inflation, improve income distribution, and readjust the balance of payments. An increase in production of goods for the private-sector should follow a labor-intensive strategy wherever possible. The goal of production should be to satisfy internal demand through import substitution and to increase exports to achieve a trade surplus parallel to this production goal. The public sector should expand its efforts in education, health, water, sanitation, and transportation infrastructure all financed by user charge taxes and long term loans for the infrastructure.

Knight asserts that the best development strategy for Brazil must be an investment strategy. He discusses this in relation to agriculture, industry, energy, and basic public services. He contends that the government should pursue the development of social services (education, health) not merely for moral reasons but for pragmatic ones; for example, improved health and education will increase the utilization and productivity of the poor. In terms of the private sector, Knight

thinks that the state should use its fiscal and regulatory power, as well as a system of incentives, to reorient investments toward the achievement of national goals.

He says that the state needs to declare clearly and decisively its policies to diminish the uncertainties of investors and assure their cooperation. He says that the state needs to formulate a coherent incomes policy and clarify its own role in the economy. Within the scope of implementing such a strategy, according to Knight, are the following: a reform of the currency, and a revamping of monetary policies, various incentives, and the financial system as well as fiscal policies, trade policies, income policies, and domestic public debt.

Over the last ten years, he points out, the role of the public sector in providing social services and controlling direct productive activities has expanded. There is a growing feeling among Brazilians, however, that were the private sector to take over direct productive activities efficiency would increase and the public sector would then be able to concentrate on those public services that the private sector cannot provide.

Speaking of the mechanics of strategy implementation, Knight says that sound economic planning is desirable, and that there must also be a clearly articulated statement of short-term and long-term objectives and of the methods that will be used to achieve proposed goals. He says that programs and projects will need to be evaluated and the system of keeping national accounts will have to be improved. Finally, Knight asserts that the Brazilian development process can take place only if suitable arrangements can be made with Brazilian's creditors.

In the next chapter, Manuel Zymelman makes a connection between the process of development and training. He begins with the principle, enunciated by mercantilists, that national wealth is a direct function of the quality and quantity of the population. Zymelman goes on to say that, while this notion was rejected by classical economists, who felt that the prime mover of economies was inert capital, by the end of the 19th century both industrialists and policy makers realized that vocational training was needed to increase productivity. After World War II, technological change required new and sophisticated skills to keep new machines operating efficiently. Today, the technological gap between developed and developing countries cannot be narrowed without building human capital, that is, persons trained in needed basic academic skills and technological skills.

Technological progress influences the education system in two ways: advanced technology requires a more highly trained labor force which receives higher wages; higher incomes change consumer patterns, increasing the demand for goods that incorporate higher technology, which in turn increases the need for a better skilled and better educated work force.

Historically, the formal education provided in high schools and colleges was selective, and vocational education thus came to be seen as education for the lower class. But over the last two decades, formal academic schooling has become more widespread and institutions that used

to train only for high status jobs now train for most jobs. Zymelman shows that it is often quite difficult to introduce vocational elements into an academic curriculum. Specialization is, thus, generally reserved until after students have received some minimum amount of academic training. Zymelman does not see this as a problem. Since most modern jobs require more mental than physical ability, a general education that is flexible will respond rapidly to the requirements of the labor market.

Finally, Zymelman says that developing countries today should not attempt to imitate patterns used by developing countries in the past. He supports the idea of the work place providing on-the-job training and formal schooling providing a general education that prepares students for vocational activities.

The next four chapters in this volume cover the evolution of the organizational structure and the performance of vocational training in Brazil.

In the fourth chapter Morris A. Horowitz discusses both the actual and the desirable organization of the vocational training system in Brazil. Currently, he says, responsibilities and controls are not well specified.

He notes that in 1942 Brazil initiated a formal policy for vocational training when SENAI was created by Law. In 1946, SENAC (the National Service for Commercial Apprenticeship) was created as a parallel vocational instrument for non-industrial needs. The same year all vocational training in Brazil was put under one umbrella organization, the National Vocational Training System (NVTS), controlled by the Ministry of Labor. Economic planning and vocational training, however, have never been integrated. The first two national economic plans had no details on resources needed to accomplish targets, while the present economic plan (the third plan) contains only generalities and has no provision for education or for achieving goals that are, to begin with, ill-specified.

Horowitz contends that failures to plan human resource needs leads to economic waste and unemployment. Brazil, he says, needs to plan for vocational training and must establish closer links between economic planning and manpower training. He declares that informational structures must be improved to assure that plans are truly responsive to labor market requirements. Dependable information on economic trends will expedite business decisions and help training institutions determine what skills are truly needed. Thus, waste will decrease, and needed training can expand.

In the fifth chapter, which is devoted to training activities of SENAI, Antonio de Andrade, Eloysio da Silva and Francisco Abreu address themselves to the problems of evaluating "vocational training." They argue that training should not, and in fact cannot, be carried on in a vacuum. Training should focus on the whole individual. It is their feeling, that SENAI trainees must be able to adjust in society. They go on to note the need to improve teaching methods, update machines and tools, and improve the quality of instructors.

The authors give a statistical profile of the present economic situation on which the relevance of vocational training depends. The pattern of inflation, unemployment, income distribution, and the effect of industrialization on economic behavior is noted, and the conclusion is put forth that the main problem over the short run seems to be under-utilization of both physical and human resources.

The authors observe that the crisis of 1979-83 reduced the demand for labor, and the ensuing smaller payrolls caused a decline of 44% in funds available for SENAI. Thus SENAI was forced to curtail both expansion and improvements. Among its current priorities are development of mobile training units, modernization of vocational training centers, implementation of research and evaluation studies, improvement of SENAI personnel, including responsiveness of training to needs of small and medium enterprises, and social programs for low income groups. An example of an evaluation by the SENAI Regional Department of Sao Paulo is presented. They also discuss attempts to formulate a policy based on the need for and availability of trained workers and to reorganize SENAI by specific function.

Finally, the authors present a cross country comparison of vocational systems using as examples Brazil and Japan. The comparison employs various indicators to evaluate the efficiency of vocational training programs within the socio-economic systems of these nations.

Chapter 6 examines the role of SENAC in shaping the non-industrial manpower base of Brazil. According to Roberto Regnier vocational training in Brazil must respond to changes occurring in the Brazilian economy due to expansion, contraction, and technological change. One of the major problems of Brazil is that about half of the potential work force is composed of underemployed workers. Because of economic contraction, labor demand has eroded over the last few years and the remaining demand has shifted direction in terms of skills and training qualifications.

In Brazil, minimum literacy is still frequently lacking. The average person has only 3.3 years of schooling and about one-third of the population is still illiterate. A mass exodus from agriculture has also occurred over the last half a century. In the 1930's, more than half of the population in Brazil was engaged in agriculture; today less than one-third of it is in that sector and 50% of the labor force is engaged, for better or for the worse, in services. It seems that all net transfers of the labor force from agriculture went to services. This is why SENAC's mission has gained special significance.

SENAC has adopted five operational models for training: vocational training centers, pedagogic enterprises, telecommunications, mobile units and on-the-job training. SENAC's programs are mostly financed by its own resources, and it serves one-third of all counties of Brazil. By 1983, it had trained over one million students with a very low dropout rate (10%). This is accomplished at a low cost of about U.S. $10 per student.

In Chapter 7, Paul Ammann and Gustav Schachter examine the macro

statistics available in Brazil for analysis and evaluation of vocational education. The authors point out that a substantially improved system of statistics rather than that which has been traditionally available in Brazil would considerably help policy makers to make wise choices. In this paper, key variables are defined and put into the proper dimension for future policymaking. The authors, however, warn that little interpretation for future policy making is possible with existing formal data.

In Brazil, the labor market is defined as either "formal" or "non formal." In the 1980's, the data for the formal market are abundant, but those for the "non formal" are still sparse. This is true also for output data. The latest data available are for 1975, while only indices for twelve aggregate sectors have been published for subsequent years.

From the data available, the authors attempt to measure the capacity of "supply" of vocational education and to determine a balance between vocational education capacity and labor market requirements. Ammann and Schachter conclude that, in spite of the growing unemployment, the total capacity deficit of vocational education is large.

Because of data inconsistencies, production levels appear to have been stationary, while the labor force seems to have increased significantly. Other data confirm this inconsistency and suggest that it has resulted in misleading conclusions about labor market requirements and productivity change. A better analysis on the relationship and response of training to sectoral demand for labor is possible. Indeed, data indicate that the increases in enrollments in training programs between 1975-1982 were less than employment growth. This was due to lack of skilled workers during the preceding decade of expansion and to the fact that in less developed countries economic contraction impacts employment more severely than unemployment. The authors point out that the restructuring of data, which began in 1980, will make better analysis possible in the future, particularly useful will be the Ministry of Labor's Social Information System (RAIS) and Vocational Education Information System (SMFMO).

In Chapter 8, Andrew Sum analyzes the impact of vocational education programs on the labor market in the United States. The author first traces the development of the vocational education system in the United States culminating in the Carl D. Perkins Vocational Education Act of 1984. He then discusses the debate on the role of vocational education in United States high schools, noting that the argument is mainly between those who would eliminate vocational education as a separate high school curriculum and those who want to expand and strengthen vocational education curricula.

To assess which group captures current realities in the U.S.A., the author feels that reliable estimates of the impact of vocational training are necessary. He goes on to discuss the conceptual and methodological issues involved in getting such reliable estimates. He proposes that questions should be asked about the labor market experiences of graduates from vocational training programs and similar students not receiving such training in high school and tied more

closely to labor market requirements. Social and private benefits of such training programs appear to be dependent on their ability to prepare graduates for jobs where classroom training skills are utilized on the job and viewed as relevant by employers. Sum presents findings on seven evaluation studies, designed to estimate the impact of vocational education programs on employment and earnings in the United States. The author shows that, in addition to the participants, other groups may benefit from vocational training program. These groups include employers of participants; workers employed in occupations that are complementary to the jobs held by participants; and consumers of goods and services produced by firms hiring participants. Sum concludes that, rather than eliminate vocational training from high schools, the vocational courses could be limited. At the same time they should be strengthened.

Noting that there should be a closer relationship between training programs and employers, Sum cites SENAI's experience in Brazil with such partnerships. Evaluation of vocational training programs in Brazil, however, is not conclusive. Indeed, in Brazil, the expansion of enrollment at SENAI is more employer-induced than worker-induced. In the last analysis, the success of vocational training in Brazil will be a function of the condition and structure of the economy, but, in turn, the condition of the economy will remain a function of the quality of human resources.

All contributors to this volume seem to conclude that there is a close relationship between the health of the economy and the quality of available human resources. Planning vocational training should be an integral part of macro planning for the economy as a whole. Training may be geared to existing labor market demand, or it may anticipate future demand in providing such skills. This latter role may well encourage employers to invest, knowing that the human resources required for specific production processes will be available.

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CHAPTER 2

ECONOMIC STABILIZATION AND MEDIUM TERM DEVELOPMENT STRATEGY IN BRAZIL

by
Peter T. Knight*

Brazil's new Government faces a challenge and an opportunity. The challenge is to devise a new development strategy that makes economic recovery and sustainable development compatible with sharply falling rates of inflation. The opportunity to do this is now, when conditions for reconciling these apparently conflicting objectives exist.

In the 1970's, Brazil succeeded in directing investments to strategic sectors that could make the country less dependent on imported energy and establish a new basis for expanding both exports and production for the domestic market. But the second petroleum price shock of 1979 was the first of several factors that triggered a severe recession. Since 1980, policies have been directed to stabilization, and in late 1982 Brazil negotiated a three-year program of support from the International Monetrary fund.

There can be no doubt about the high social and economic costs of the economic crisis, which in Brazil has been more severe than that caused by the Great Depression in the 1930's, and of the subsequent stabilization effort. During the recession, per capita GNP fell by more than 12%, inflation accelerated to over 200% per year, investment in new productive capacity fell sharply, and open unemployment increased to 7-8%. Since Brazil's system of unemployment compensation is limited, few can afford to stay unemployed, and consequently many who lose their jobs in the "formal" sector resort to various forms of

*Senior Economist, Brazil Division, the World Bank. This paper is a revised and expanded version of one prepared for oral presentation at Northeastern University in June 1984 and at the Institute for Economic and Social Research (INPES) of the Brazilian Secretariat of Planning (SEPLAN) and the Sao Paulo Metropolitan Company in August 1984. The author gratefully acknowledges the helpful comments made by participants at these presentations as well as those received on earlier drafts from Paulo Azevedo Moura, Frederick Berger, Luis Aranha Correa do Lago, Rui Coutinho, Michal Gartenkraut, Alen Gelb, Thomas Glaessner, Lewis Goodman, Ricardo Moran, Richard Newfarmer, Guy Pfeffermann, Bruce Ross-Larsen, Paul Streeten, Nils Tcheyan, William Tyler, and John Williamson. The views and interpretations expressed here, however, are the sole responsibility of the author and should not be attributed to the World Bank, to its affiliated institutions, nor to any individual acting on their behalf.

marginal, low-productivity employment. Urban crime has increased, and sporadic outbursts of violence have occurred in both urban and rural areas. High productivity employment will have to grow faster than the labor force for some years just to absorb the impact of the crisis.

But in the course of this costly stabilization, the prices of capital relative to labor and of tradables relative to non-tradables have risen, providing increased incentives to employ labor, allocate capital efficiently, and generate a needed trade suplus. The consolidated public sector deficit has been sharply curtailed -- if monetary and exchange corrections on the public debt are subtracted. The 1983 maxidevaluation permitted a balance of trade surplus of $6.5 billion; in 1984 the surplus was over twice as large. Coupled with annual debt reschedulings and access to IMF resources, the improved trade performance has permitted the elimination of payments arrears and substantial reserve accumulation. Investments in domestic petroleum production, fuel alcohol, electric power, and other substitutes for imported petroleum have increased substantially, allowing Brazil to produce about half of its petroleum needs in 1984 compared with 15% in 1979. Led by the rapid expansion of exports, the recession ended in 1984. Preliminary estimates indicate GDP growth for the year of 4.1%, but inflation acclerated to 224%.

The outlook for the near-term future is favorable. The price of Brazil's remaining petroleum imports is falling, as are interest rates on the bulk of the foreign debt. There is still considerable unused capacity in industry (because of the recession), and agricultural output can be expanded rapidly if a favorable policy environment is established. The conditions exist, therefore, to sustain the recovery without accelerating inflation, and indeed to sharply reduce or eliminate inflation. If this opportunity is seized now, Brazil's new Government can launch the country on a trajectory of growth and development that realize broadly held aspirations to join the ranks of industrialized western democracies by the end of the century.

The challenge is a difficult one. It requires bold and decisive innovation by economic policy makers to design a coherent economic program. Changes in the international economic environment require a further realignment of economic incentives to allow sustainable economic growth. The rapid expansion of the public sector in the 1970's and early 1980's has left a legacy of debt and institutional disarray, which needs to be corrected by major improvements in public sector management. Accelerating inflation and real domestic interest rates of 30% to 40% in the free segments of the credit market signal that economic stabilization is incomplete.

A coherent economic program would realign economic incentives, improve public sector management, and complete the economic stabilization. Announcement of such a program, a major effort to explain its advantages, and consistent initial steps to implement it could help establish the new Government's credibility and mobilize domestic political support for any initial sacrifices required to reap its benefits. This support and credibility would be necessary both to complete the implementation of the program and to convince the international finan-

cial community that its best interests would be served by a resumption of net lending to Brazil. Reduction of the foreign debt burden over the medium-term should increase the returns to Brazil from participation in the international trade and financial systems by permitting economic recovery and continued structural adjustment to take place with increasing real income for most Brazilians.

WHY A COHERENT ECONOMIC PROGRAM IS NECESSARY

Brazil's newly elected President, Tancredo Neves, has indicated that his Government's principal task should be to increase economic growth, which should expand employment, improve the remuneration of the labor force, and result in a more equitable distribution of the national income. For this growth to be solidly based, he has stated, requires a decline in inflation, putting the finances of the public sector on a sound footing, and maintaining equilibrium in the external accounts. Other stated objectives deemed necessary to achieve these goals include generating a substantial trade surplus through aggressive export promotion and maintaining a realistic exchange rate, encouraging private enterprise, and containing the growth of the state's presence in the economy while still using this presence to promote public welfare and correct social injustices.

Achieving these objectives will require preparing and implementing a coherent economic program to prevent the emergence of avoidable conflicts between measures adopted to pursue the different objectives. In designing such a program, policy makers would be well advised to consider the nature of the international economic environment, the adequacy of the economic incentive system guiding decentralized economic decision-making, the heritage of the rapid and disorderly expansion of the public sector, and the incompleteness of the economic stabilization to date.

Changed and Uncertain International Economic Environment

Brazilian economic growth in the 1970's was centered on the expansion of the durable consumer goods, capital equipment, intermediate inputs, and basic metal industries, supported by heavy investment in economic infrastructure. This growth process, in which state enterprises played an expanding role, was increasingly financed by foreign loans. It produced impressive achievements but depended heavily on cheap energy, and cheap and abundant flows of foreign capital. GDP growth averaged over 8% a year from 1965 through 1980. This growth was fast enough to reduce underemployment and unemployment, while increasing the real incomes of almost all the population. But Brazil's pronounced income inequality was not reduced, and by 1980 the basic needs of perhaps a third of the population were still not being met (Knight and Moran, Poverty and Basic Needs, 1981).

Since the first oil shock, the international economic environment has undergone massive changes. The current crisis cannot be considered over, despite the recovery which became apparent in 1984. The crisis was precipitated by the second oil shock, the interest rate shock, and a sharp deterioration in the prices of important Brazilian exports —

all factors beyond Brazil's control. But the country's high external indebtedness and the fact that it was still importing more than 80% of its petroleum requirements when the second oil shock struck, coupled with the small share of its manufactured exports in GDP, made Brazil particularly vulnerable to these shocks. Foreign loans no longer cover debt service, much less provide new resources, and real interest rates continue high by historical standards. So Brazil must self-finance a larger portion of its investment while making net resource transfers to its creditors, as it has for the past three years.

The 1984 recovery was led by exports. The increase was directed largely toward the United States, spurred by that country's rapid recovery and the strong dollar. The U.S. economy is now slowing down, however, and its trade and fiscal deficits will have to be reduced. The dollar is expected to fall, but how much and when is uncertain. It is also unclear how much the slowdown in the U.S. economy will be compensated for by faster growth in the other OECD economies and in the less developed countries still affected by the debt crisis and low commodity prices. Protectionism appears to be growing in the industrialized countries, but its advance may be limited if OECD growth is strong. While few analysts expect real international interest rates to return to the low levels of the 1970's, there is also great uncertainty about the real rates that will prevail. Similar confusion surrounds the future price of petroleum. The high degree of uncertainty in the international economic environment means that Brazil needs to increase the flexibility of its economy to respond both to new opportunities in international markets and to new negative shocks.

Misaligned Economic Incentives

Economic incentives, set by government policies and designed to induce desired behavior by decentralized decision-makers, operate in two ways. They operate through the price system, including exchange rates, interest rates, wage rates, tariffs for public services, and taxes. They also operate through administrative regulations, such as quantitative restrictions on trade, price controls, and product licensing. Recent experience in Brazil and other countries provides clear examples of why, when interventions are judged necessary, those working through the price system are usually much more efficient than those requiring administrative discretion. When discriminatory incentives become widespread — as in Brazil during the 1970's — it becomes difficult to calculate their net impact on the composition of investment, production, and trade. If indirect effects (on suppliers, suppliers of suppliers, and so on) are taken into account, the task becomes impossible. Most importantly, decentralized decisionmakers are led to divert more of their energies and resources to seeking special favors and less to improving productive efficiency.

Brazil's incentive system, despite recent improvements, could still be better aligned to promote adjustment of the economy to the economic conditions that may be expected to prevail over the rest of the decade. First, there are very high levels of protection for domestic market sales resulting in a policy bias discouraging export expansion. Second, there is a pervasive inequality in the treatment of dif-

ferent sectors and products, which is not conducive to efficient import substitution. Third, a wide degree of discretion is allowed the administrators of the incentive system. The resulting lack of automaticity generates uncertainty, invites corruption, resulting in disproportionately high administrative expenses for producing firms, and especially hurts small and medium-sized firms. Fourth, because capital is often underpriced, and labor use highly taxed, the incentive system is biased against employment generation. Fifth, because of the frequently conflicting policy instruments, the incentive system, viewed through its effects, lacks a clearly defined rationale.

Financial policies provide a good illustration of some of these characteristics over the past decade. The financial system was used to compensate certain sectors, notably agriculture and export industries, for the adverse consequences of price controls and an overvalued exchange rate. This increased the system's complexity and led to greater segmentation: interest rates varied widely depending on the sector, purpose, region, nature of the borrower, and source of funds.

Credit subsidies and financial market fragmentation became major sources of renewed inflationary pressure, policy-induced distortions, and allocative efficiency losses. Financial arbitrage and the search for favorable credit terms absorbed entreprenuerial and managerial resources with a high opportunity cost in output. The structure of the overall system and the difficulty of controlling numerous, highly selective credit lines have been responsible for many of the problems experienced in controlling levels of economic activity and inflation over the past decade. Powerful financial feedbacks amplified the effect of exogeneous disturbances and accelerated inflation, which then became institutionalized in Brazil's highly indexed economy. In addition, fiscal and monetary policies were used to raise domestic interest rates above those in the international credit markets. This condition persists, despite the present unavailability of voluntary lending to Brazil by international banks (World Banks, Financial Systems Review 1984).

Even if foreign loans were available, it would not be advisable for Brazil to accumulate foreign debt at past rates. The need for Brazil to mobilize more domestic resources for investment is clear, but the trend has been in the opposite direction. Gross national savings fell from an average of 24.9% of GNP during 1973-77 to 17.1% in 1982, the last year for which national accounts are available. The savings rate fell each year after 1977.

The underpricing of capital through both credit subsidies and fiscal incentives and a plethora of excessively specific special programs have reduced economic efficiency and employment growth. Credit subsidies alone amounted to almost 6% of GDP at their peak in 1979. Exchange rate overvaluation also cheapened imported capital goods until the maxidevaluation of February 1983, though the law of similars had the effect of raising the prices of capital goods produced in Brazil. Taxes and quasi taxes on labor use (principally social security and employees indemnity fund contributions) have raised the cost of labor well above wages -- currently by some 40% for urban labor. Clearly,

these incentive policies have worked against employment generation. The wide array of capital subsidies has also resulted in very different effective costs of capital to different enterprises -- depending on the activity, location, ownership of capital, prevailing rate of inflation over the life of investments financed by loans, and many other factors having little to do with productive efficiency. The net impact on profitability of so wide a range of incentives applied to such a variety of investments is almost impossible to gauge. But there can be no doubt that this excessive use of capital subsidies has high economic costs.

Brazil's industrial employment has declined more than 20% since 1980. While economic recovery will raise employment, it may not by itself, other things being equal, eliminate the country's accumulated problems of unemployment and underemployment. Making better use of Brazil's human resources should be a major objective of development strategy. Balance of payment constraints and the need to complete the economic stabilization are apt to keep GDP growth for the rest of the decade below that experienced in the 1970's. This is especially true if real international interest rates remain high, world economic recovery is sluggish, and domestic inflation continues to be high. Even with a 7% GDP growth rate, employment growth is likely to fall below the projected 3% a year increase in the labor force, reducing poverty will be extremely difficult.

Relative prices have been moving in favor of labor, as interest rate subsidies are phased out, market interest rates have risen sharply, and real wages have fallen. This change in the relative prices of labor and capital should favor increased employment generation as the economy grows. But restoring economic growth will require a fall in real interest rates from their current excessively high levels if needed productive investment is to be encouraged. And real wages should increase within the bounds set by productivity increases to realize the new Government's stated objective of increasing real wages. Hence there is a need to consider reductions in nonwage labor costs to maintain strong incentives to expand employment.

Rapid and Disorderly Expansion of the Public Sector

During the 1970's and early 1980's, Brazil's public sector expanded rapidly. By 1982 the financial resources under the direct control of the federal government reached 46% of GDP (World Bank, Economic Memorandum 1984).[1] Outside the centrally planned economies, few public sectors command so large a share of the financial resources of the economy. A large share of these resources has been directed to

[1]The resources include federal government tax revenues, the operating and non-operating revenues of the federally owned enterprises and autonomous agencies, the domestic and foreing credit resources at the disposition of the government and its enterprises, and the resources at the disposition of the government and its enterprises, and the resources from subsidized credit programs extended to the private sector through the financial intermediaries.

state enterprises or, through government banks, to financing private sector investment. Government decisions have largely replaced the price mechanism in determining the composition of investment and hence the emerging structure of productive capacity (World Bank, Economic Memorandum 1984).

The public sector's operations have become increasingly complex, diverse, and distortionary for three main reasons. The government sought to maintain investment and growth in a difficult external environment, counter inflationary trends (for which growing public sector deficits were themselves largely responsible), and meet a variety of competing and sometimes conflicting social objectives.

The rapid and largely unplanned expansion of state enterprises was an important sources of inflationary pressure, and of the accumulation of public debt. Most of the largest enterprises in banking, basic industry, petroleum, mining, electricity, aircraft, and military equipment are state enterprises. The largest — such as Petrobras and the Companhia do Vale do Rio Doce -- have established so many subsidiaries that they are now among the world's larger conglomerates. Meanwhile, traditional government functions have been subjected to severe financial constraints.

Total expenditures of the public sector expanded mainly through the monetary budget, administered by the Central Bank. Initially intended as a tool of monetary restraint, the monetary budget was used increasingly to channel development and welfare expenditures through a number of subsidized credit programs and through producer and consumer subsidies for basic commodities such as wheat and petroleum. While the fiscal budget recorded surpluses in some years, the monetary budget was responsible for massive deficits and was not subject to review by Congress. Especially after 1980, a major share of these expenditures was financed by net issues of federal government securities. Heavy external borrowing was undertaken by major state enterprises to finance ambitious investment plans not subject to any systematic review and for which these enterprises were not permitted to borrow on domestic capital markets. Foreign borrowing by state enterprises was also used to obtain resources for the Central Bank to finance its foreign exchange requirements more cheaply than could have been done without the intermediation of these enterprises.

In the wake of the maxidevaluations in December 1979 and February 1983, the Bank of Brazil was forced to make large loans to state enterprises unable to meet payments on their foreign obligations. Domestic borrowing by state and municipal governments was also heavy. Half the value of outstanding loans of Brazilian commercial banks is now held by nonfinancial government entities. Defined to include the debt of all levels of government and the state enterprises, the public sector domestic debt owed to the private sector now exceeds 20% of GNP. The foreign debt directly held by the public sector is also about 20% of GDP. Servicing this heavy debt burden poses serious obstacles to continuing economic recovery.

The domestic public debt is closely associated with the foreign debt and the shortage of foreign exchange. Because of that shortage, beginning in the late 1970's, the authorities encouraged foreign borrowing by deliberately raising domestic interest rates above the domestic cost of foreign borrowing and by directly regulating public sector enterprises. In addition to federal government securities, the total domestic public debt to the private sector includes the debt of state enterprises and the social security system to the banking system and their suppliers, and the debt of state and municipal governments. The pressure of this debt has been one of several factors pushing domestic interest rates to extraordinarily high levels. This in turn has crowded out the private sector from access to a declining real supply of credit. Loans to nonfinancial public sector enterprises accounted for 44% of all commercial bank loans outstanding in June 1984, compared with 17% at the end of 1978.

The effective annualized real interest rate on federal government securities (including the discount on the face value) is now about 19%. Assuming an average interest rate (net of taxes) of 12% on the total domestic and foreign public sector debt, conservatively estimated at 35% of GDP net of foreign reserves held by the Central Bank and deposits of public sector entities in the private financial system, the interest cost to the public sector amounts to about 4% of GDP. As long as the rate of interest on the public debt exceeds the rate of growth of GDP, an increasing fraction of the national income must be transferred to domestic and foreign creditors even if the principal is not repaid. This in turn means that the tax burden (defined to include public sector product price increases destined for debt service) must increase to service the debt, posing both a domestic and an external transfer problem. If there were no growth in GDP, simply to stabilize the total public debt at 35% of GDP would require generating an operational suplus of 4.2% of GDP. If GDP growth were 5%, the needed surplus would be reduced to 2.5% of GDP, since growth would generate increased tax revenues (da Silva, 1984).

Improved public sector management is required to correct the distortions that developed in the 1970's and early 1980's. The main thrust of measures taken to date has been to bring public sector expenditures, however financed, under better control. Considerable progress has been made toward establishing a consolidated federal budget that would permit evaluation of the overall impact of fiscal and monetary policy, but such a budget still does not exist for operational purposes. Investment expenditures have borne the brunt of the cuts to date, although wage restraint has also played a major part. But Brazil still lacks a unified public sector investment program that would permit policymakers to assess better the costs and benefits of proposed public investments.

Incomplete Economic Stabilization

Persistent inflation, which is accelerating again, is the most obvious sign that economic stabilization is incomeplete. While the symptoms are clear enough, the underlying problem is extremely complex and does not lend itself to simple solutions. One aspect of the pro-

blem is the need to transfer real resources from debtors to creditors, both Brazilian and foreign. Such large transfers involve substantial costs to major economic actors, who attempt to protect their real incomes. The most important institutional expressions of this effort to protect income shares in Brazil are the indexation system (which encompasses wages, financial instruments, and the exchange rate) and markup pricing. Where markup pricing prevails, principally in much of the industrial sector and public sector enterprises providing some key goods and services, decisionmakers tend to increase rather than decrease their prices in the face of sluggish demand, unless their costs fall. Meanwhile, the indexation of wages, the exchange rate, and financial instruments makes downward adjustments of costs difficult.

These institutional features of the Brazilian economy greatly complicate the stabilization effort, which has relied principally on the control of aggregate demand. Thus, while Brazil has surpassed its external performance criteria under the IMF-supported program, inflation has more than doubled, reaching 224% for the 12 months ending December 1984. Targets and performance criteria depending on the domestic inflation rate have been either consistently missed or met only with extreme difficulty.

As noted, the intransigence of Brazilian inflation, despite severe tightening of domestic aggregate demand, is in part explained by Brazil's comprehensive system of indexation. While such institutional arrangements protect much of the economy from real losses associated with inflation, in doing so they make reducing inflation more difficult and worsen the tradeoff between price stabilization and output and employment. Because today's rates of change in wages, the monetary correction index, and the exchange rate are indexed to past inflation, today's inflation rate, in large measure, reflects previous rates of inflation. Even where formal indexation is absent, as in price formation by oligopolistic industrial firms or the determination of market interest rates for unindexed financial instruments, expectation of future inflation based on past inflation rates has a similar effect. With today's price changes largely reflecting changes occurring in the past, sensitivity to current demand movements in reduced. Moreover, when prices are determined largely by supply conditions -- such as past rates of changes in wages, exchange rates, interest rates, and prices of intermediate inputs -- a decline in aggregate demand leads to a larger output decline relative to a given inflation decrease than in a nonindexed economy.

High inflation and indexation have led to a predictable shift away from nonindexed financial assets, such as currency and demand deposits, toward indexed financial instruments bearing full monetary correction, such as time deposits and passbook savings accounts. Monetary policy has focused on holding the expansion of narrow monetary aggregates (the monetary base and means of payment of M1) below the rate of inflation. The supply of and demand for narrow money aggregates was sharply reduced in real terms. But, again in real terms, the supply of broader measures of liquidity has been quite stable. The sale of government securities, while putting upward pressure on interest rates, has not led to the expected control of liquidity, because even indexed long-

term government securities have been turned into highly liquid assets by an innovative and sophisticated financial system. In effect, cheap liquidity (from the point of view of the government) has been replaced by expensive liquidity.

The contraction of the monetary base to 2.3% of GDP at the end of 1984 (even after the large increase in December) compared with 5.3% at the end of 1979 -- along with (a) uncertainty about future financial policies(including possible modifications in the indexation of financial instruments), (b) tax benefits and a guaranteed return of over 6% per year plus monetary correction on passbook savings accounts which cannot be invested outside the housing sector, (c) high compulsory reserve requirements (currently 50% for large banks in the most economically developed parts of the country), (d) a fiscal wedge between interest rates received by providers of funds and borrowers occasioned principally by the financial transactions tax (IOF) and the witholding tax on interest, and (e) some continued earmarking of substantial fractions of commercial bank loans for lending at below-market rates for favored purposes (agricultural credit, loans to small and medium enterprises, etc.) at below market rates -- have together maintained real lending rates for working capital in the 30%-40% range.

Rising real interest rates contribute to inflation by increasing financial costs, which in much of the industrial sector and a number of state enterprises with administered prices, tend to be passed on to customers. To complete the stabilization and resume sustainable levels of growth requires a fall in real interest rates. Without that fall, no recovery of productive investment is possible. Bringing interest rates down and increasing capacity utilization would decrease average costs in the markup sector of the economy, allowing price increases below the rate of inflation without cutting profit margins.

Reducing the inflation rate is important for increasing confidence in economic management, thus facilitating acceptance of the Government's program at home as well as an eventual return to voluntary lending by foreign commercial banks. Too much entrepreneurial effort is now diverted from more productive pursuits to competition for income shares, to assurance of financial survival, or to speculation. Moreover, under current institutional arrangements, inflation at over 10% a month is highly unstable upward and could easily accelerate into hyperinflation if met with new demands (for example, wage) or supply shocks. Thus even though the economy is not overheated in conventional terms, the sensitivity of inflationary expectations to aggregate demand policies requires great caution in any policy moves in an expansionary direction. Finally, inflation is socially unjust, having the most effect on the poorest -- the unemployed, workers in the informal sector -- and those whose principal financial assets are cash and demand deposits, again most often the poor.

BASIC ELEMENTS OF A COHERENT ECONOMIC PROGRAM

Brazil's new Government already has a clear statement of its objectives. Designing a coherent economic program to achieve them presents a major challenge. Both technical skill on the part of policy-

makers and strong political leadership will be required to minimize potential conflicts between growth, equity, and stabilization objectives. A social pact could provide the necessary framework for negotiating the broad political support necessary for successful implementation in a democratic setting.

I have argued elsewhere (Knight, 1981; Knight and Moran, 1981) in favor of a medium-term development strategy for Brazil, which I believe can achieve the growth and equity objectives within the constraints posed by the international economic environment and is consistent with the stabilization objective. In this section I outline my current views on this topic and seek to integrate them with an approach to stabilization that draws on important new work by several Brazilian economists.

A New Medium-Term Strategy

The essence of the strategy is to increase production of basic wage goods (through the private sector), to expand basic public services (through the public sector), and to stimulate exports and efficient import substitution to produce a necessary trade surplus. Wage goods production would be stimulated by tax and credit reforms designed to increase employment and reduce the real market prices of such goods. Public services would be financed by a combination of taxes, user charges, and long-term borrowing (the latter restricted to investment in physical and social infrastructure). The trade surplus would be induced through the exchange rate and by eliminating anti-export biases in trade policy. Brazil in the remainder of the 1980's would invest more in education and basic health services, water supply, sewerage, and transportation infrastructure (particularly railways and water transportation rather than highways). The pattern of production for the domestic consumer market would shift toward low-cost housing, food clothing, simple house furnishings, bicycles, motorcycles, and busses; and away from luxury housing, video recorders, cosmetic surgery, private automobiles and the like, though exports of sophisticated goods and services would be encouraged.

There would be no relaxation of Brazil's successful drive to expand exports, especially industrial exports, which have been, on average, more labor-intensive than import substitutes (Tyler, 1976; Zagan and Rego, 1979). Locatelli (1982) found that direct and indirect labor requirements for all exports were over twice as high as those for imports. In fact the export drive will have to be intensified, not only to service the foreign debt but also to pay for needed imports, including advanced capital goods necessary to increase the economy's overall efficiency. No further decline in real wages is necessary to achieve international competitiveness, though the growth of the domestic market, which should come principally from the expansion of employment rather than wage increases in the initial stages, will necessarily have to be slower than the growth of exports for some time, unless substantial foreign debt relief can be negotiated.

The new strategy would be both inward and outward looking. In fact these labels serve more to confuse than to enlighten. The empha-

sis is on efficiency, employment, generation, domestic resource mobilization, and competitiveness in world markets. The strategy is realistic. It recognizes the need to generate a trade surplus even after renegotiation of the foreign debt, and to rely less on foreign capital inflows. This realism should help convince the international financial community to do its share to make the strategy successful by easing the debt burden.

The public sector will need increased financial resources in the traditional areas of intervention (health, education, scientific research, public safety, transportation). But equally important is seeking greater efficiency in the provision of these services. This is not an easy task and will require both institutional reforms and a better process of program evaluation leading to cost containment.

Brazil needs to invest heavily in its human resources. Improved health, education, and nutrition can have a strong impact on the productivity of the poor, potentially increasing their incomes (World Bank, 1981). Developing a highly-skilled and productive labor force is necessary to make the transition to a higher-wage information-based economy in the twenty-first century. With an adult literacy rate of 24% and a secondary school enrollment rate of only 35%, Brazil has a long way to go. Investment in science and technology has been sharply cut during the current stabilization, and this pattern needs to be reversed. Investment in the private sector would be reoriented by changes in the incentive system. Basic public services and consumer goods and services are more labor and less import intensive the consumption mix characteristic of the middle and upper classes (Locatelli, 1982).[2]

Implementing this medium-term strategy will require further realignment of the incentive system, improved public sector management, and a new approach to completing the economic stabilization. In a democratic political environment, extensive negotiations will be necessary to obtain the broad support necessary for success. Implementation would also be facilitated by foreign debt renegotiation. The process of negotiation, both domestic and international could establish stable

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[2]Locatelli (1982) investigates the direct and indirect labor and import use associated with a more equal distribution of income, as well as the tradeoff between equity and growth. Using data from the 1970 input-output table and the National Household Expenditure Study (ENDEF) of 1974-75, he shows that the consumption of poor families (expenditures less than two minimum wages) is some 66% greater than for rich families (expenditures above ten minimum wages). His simulations show that the level of employment is very sensitive to income distribution. The direct and indirect import requirements of a more equity-oriented growth strategy are shown to be slightly less than if income distribution is unchanged. And the sacrifice in growth rates is small (on the order of 1% of GDP). This analysis needs to be updated to take into account structural changes in the Brazilian economy over the 1970's.

rules for the economic game that would strengthen the prospects for a new period of economic and social development in Brazil.

Realigning Economic Incentives

Major aspects of incentives policy that need attention include wage, exchange rate, trade, fiscal, and financial policies.

Wage Policy: If inflation is to be successfully attacked and international competitiveness in manufactures maintained, a future explosion of wages and salaries must be avoided. It is important to begin by recognizing that wages have not been a significant source of inflationary pressure since 1964, that a very substantial erosion of wages and salaries at what might be called middle class levels began in 1979, and that the decrease in real labor incomes in the formal sector was extended to incomes below three minimum wages under the November 1983 wage law. The 1983 law was increasingly ignored in much of the private as well as the public sector, and in October 1984, Congress approved a more liberal replacement. The effect of this will probably be to stop any further reduction in real wages. The new Government will almost certainly be faced with understandable demands for wage increases substantially above inflation to "correct" for the fall in real wages mandated by legislation over the past five years.

If inflation is to be brought down, wage demands must be kept moderate until the recovery is well launched, and various other reforms, proposed to implement the new economic strategy, are undertaken. This is particularly important in substantial parts of the industrial sector where oligopolistic conditions prevail and markup pricing is widespread. If wage demands can be held close to the rate of inflation, a reduction in the adjustment period avoided, and the level of capacity utilization in industry raised, it should be possible to hold price increases in the "markup sector" below inflation and thereby reduce inflation rates.

A more ambitious approach to wage policy would involve a switch of contracts to a new, temporarily indexed currency (NC) at their average real cruzeiro value over the adjustment period preceding the switch (Arida and Lara-Rezende, 1985). This possibility is discused further below in the section on completing the economic stabilization.

In any case, given the existence of underutilization capacity in both industry and agriculture, the high levels of unemployment and underemployment, the prospect that the real public sector deficit can be eliminated in 1985, and the absence of any new negative supply shocks at home or abroad, there is no argument for further compression of wages. Indeed there is some room for increases in line with productivity improvements to correct the most flagrant distortions introduced by wage policy over the past five years.

Exchange Rate Policy: The exchange rate is neutral toward export promotion and import substitution and does not discriminate against different sectors or activities. It is, therefore, the favored policy instrument for inducing the needed trade surplus, though it must be

recognized that any real devaluation can accelerate inflation and increase the burden of foreign debt service. The cruziero's par value is defined and quoted in terms of US dollars, and the nominal exchange rate is currently administered so as to devalue by the full domestic inflation (as measured by the General Price Index for Domestic Supply - IGP/DI). If a currency reform of the type suggested below is carried out, this policy would initially remain intact, though the index might be improved technically and, after a transition period, record price changes in the terms of trade and capital flows.

Trade Policy: The underlying objectives of trade policy reform would be to expand exports and stimulate efficient import substitution. One important way to achieve this is to reduce the antiexport biases in economic policies, widening the access for direct and indirect exporters to intermediate inputs at international prices. Simplifying the protection system, making greater use of tariffs and less of discretionary measures would also help. Some decrease in the average level of tariffs should also be possible if a greater reliance is placed on exchange rate policy to provide protection against imports as well as to promote exports. Together these measures should increase competitive pressures to economic efficiency.

Fiscal Reform: Almost two decades have passed since the last comprehensive tax reform in Brazil. Although a number of important tax measures were introduced during the current stabilization, the need for major reform of the Brazilian tax and transfer system is now widely recognized. The current system was designed to support a public investment program oriented to providing a capital-intensive economic infrastructure and conducted largely by federal government entities. It is highly dependent on indirect taxation. Subsidies and transfers reduced net taxation from some 17% of GDP in 1973 to 10.8% in 1980-82 (Costa, 1984), and would be much lower still if the transfers to and subsidies from the monetary authorities were subtracted. In short, the Brazilian tax and transfer system badly needs an overhaul. To be consistent with the strategy proposed, the reforms should have seven basic objectives:

(1) to raise net tax revenues;
(2) to increase equity;
(3) to decrease the price of labor relative to capital;
(4) to favor the production and consumption of essential wage goods;
(5) to increase the tax share of state and municipal governments;
(6) to discourage speculation in rural and urban land and other forms of wealth; and
(7) to help reduce interest rates.

Financial Reform: At the broadest level, the main objective of financial system reform would be to widen financial markets and render them more responsive to generalized macroeconomic (as opposed to sectoral) policies (World Bank, Financial Systems Review 1984). This should help in mobilizing more domestic resources for investment and in allocating them more efficiently. Other major objectives consistent with this reform, would be to increase the internal efficiency and sta-

bility of the system, complete the phaseout of interest rate subsidies, and bring down interest rates from their current excessively high levels. A successful completion of the economic stabilization and the creation of a stable policy environment could help reduce uncertainty, induce efficient planning by both private and public economic agents, and foster development of private sources of long-term investment capital.

The logical starting point is the reform of central government finances, discussed below, which is needed to improve public sector management. This would establish a clear separation of functions between the Central Bank, the Bank of Brazil, and the Ministry of Finance. Broader reforms might best be pursued by establishing a national financial reform commission. Such a commission could be composed of representatives of both the public and private sectors and assisted by highly qualified economists and other experts.

Improving Public Sector Management

The requirements for improved public sector management stem from the distortions, described above, that developed in the 1970's and early 1980's. These distortions need to be largely or wholly corrected in the 1980's. In addition to tax reform, discussed above, this will require reforms of central government finances; financial restructuring of some state enterprises; planning, budgeting and administrative reform; and improving the efficiency and reducing the costs of basic public services.

Reform of Central Government Finances: The coexistence of three separate public sector budgets (fiscal, monetary, and state enterprise) and the incomplete separation of functions between the Central Bank, the Bank of Brazil, and the Ministry of Finance have led to serious problems of accountability and control. This system weakens the authorities' control over global expenditures and their financing. It also obscures the sources and end uses of public resources, which is particularly inappropriate in a period of democratization, when transparency in public sector finances is necessary to facilitate accountability of the executive to Congress.

The starting point for reform of central government finances was provided by a report, issued at the end of November 1984, of an interagency committee established by the National Monetary Council in August 1984. The commission's report recommends several measures. The Central Bank would be established as the sole monetary authority, and its development banking functions would be transferred to other institutions, probably to BNDES and/or the Bank of Brazil. The Ministry of Finance would have the responsibility for issuing federal government securities. And the Bank of Brazil, through a unified federal budget, would be remunerated for its services as an agent of the Treasury, the Central Bank, or other official institutions. Any remaining subsidies on Bank of Brazil lending would be financed through the fiscal budget. Considerably more work than has been done to date is necessary to clarify how some aspects of the proposed reforms would be implemented.

Even after this is accomplished, full implementation is likely to require several years.

Financial Restructuring of State Enterprises: In the future, the large productive state enterprise sector (exclusive of those "enterprises", foundations, and autarquias that perform traditional functions) must be expected to generate more of its own investment resources internally. This would contribute to economic stabilization and encourage more efficient use of the goods and services they produce. For several years the capacity of state enterprises to do this has been undermined by public pricing policies intended to hold inflation down. The financial charges associated with past foreign borrowing at variable interest rates have mounted and currently exert heavy pressure on many of the enterprise groups. In this sector, therefore, financial restructuring, as well as improved planning for current and proposed operations of some of the most heavily indebted enterprises is urgent.

Many state enterprises -- for example those producing energy, steel, copper, and communications -- incurred foreign debt at the request of the authorities to finance the balance of payments rather than needed capital goods imports (Munhoz, 1984). Pricing these goods and services high enough to service this "excess" foreign debt forces consumers to pay an implicit tax that reduces economic efficiency. Instead, this "excess" part of the foreign debt could be serviced from general tax revenue. One way to do this would be to consolidate the "excess" debt in the Treasury and eliminate Bank of Brazil lending and fiscal transfers to state enterprises. Any additional revenues needed could be obtained by raising taxes or reducing subsidies and transfers.

Planning, Budgeting and Administrative Reform: The ability of Brazil's Government to plan development strategy and guide public sector activity toward longer-term goals has been hampered in recent years by the acuteness of the economic crisis. With the easing of the crisis, there is now an opportunity to upgrade the planning control capability in ways that can markedly improve the efficiency of resource allocation by the public sector. Among the needed improvements, in addition to the reforms of central government finance and budgeting outlined above, are:

(1) strengthening of project and program evaluation systems;
(2) developing more comprehensive systems for reporting on project and program implementation;
(3) reactivating the multiyear public sector investment planning approach developed several years ago;
(4) modifying the system of state enterprise guidance now characterized by stringent budgetary controls to provide more positive guidance and a longer-term focus; and
(5) improving the national accounts, which are not adequate for needed policy analysis and planning.

Improving the efficiency and reducing the costs of basic public services: Expanding basic public services requires not just more financial resources, but more efficient use of these resources. This calls for a long-term process of institution-building. Cost containment can be practiced by focusing publicly financed benefits on the needy (health and possibly higher education), concentrating more on prevention (health care) and maintenance (transportation), instituting greater cost-sharing through user fees, and sharpening incentives for efficient performance (virtually all public services). An area that should be tackled at once is the social security system, where pension abuses are prevalent and early retirement (after 30 years service) with full salary is allowed. Phasing out this benefit and cutting pension abuse could free up large amounts of social security funds to improve and expand health care delivery and end the endemic deficits of the social security system, thus contributing to economic stabilization.

Completing the Economic Stabilization

Completing the economic stabilization requires measures to assure that the balance of payments is in a sustainable position, the public sector operating deficit (that is the deficit after subtracting monetary and exchange corrections on the public debt) is zero or small, and that income claims do not exceed the national income available to meet them. If these preconditions are met, and the prevailing expectations are that they will continue to be met in the foreseeable future, the remaining inflation, in the absence of any new shocks outside the Government's control, will be purely inertial, that is entirely attributable to backward looking formal indexation rules and expectation formation. In these conditions a monetary reform of the type proposed by Arida and Lara-Resende (1985) could eliminate inflation.[3] But stabilization would not be complete without a substantial fall in real interest rates, which is needed to permit new investment in productive capacity, which in turn is required to assure non-inflationary growth once idle capacity has been used up. In practice, it would be advisable to consider reducing interest rates as a fourth precondition to be met before attempting a monetary reform.

Establishing the Pre-conditions for Monetary Reform

At present the first precondition appears to be met, and successful multiyear renegotiation of the foreign debt can increase the probability that it will remain so. The fiscal reform and proposed measures to improve public sector management should make it possible to fulfill the second precondition. The proposed wage policy, which might be

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[3]Arida and Lara-Resende (1985) contains an appendix with a bibliography of the Brazilian economic literature on inertial inflation and currency reform. Of particular interest is Arida (1984) which presents the monetary reform proposal in as part of a broader analysis of economic stabilization, including debt reform, fiscal reform, interest rate determination, and the formation of social pacts.

adopted as part of a broader social pact including fiscal reform, would fulfill the last precondition for rendering inflation purely inertial.

Bringing real domestic interest rates for lending down to levels close to the nominal rates prevailing in international markets could be achieved in the context of the fiscal and financial reforms. The financial transactions tax (IPF) would be eliminated. The tax on interest (currently 40% witheld at the source) would be integrated within a broader progressive income tax. This would require registration of all securities with the tax authorities and the elimination of securities issued to the bearer. Compulsory deposits on sight deposits would be sharply reduced, compulsory reserves on time deposits would be eliminated, and forced lending by commercial banks at below market rates would be phased out as part of a financial liberalization process. Together these measures could reduce to a minimum the wedge between the borrowing and lending rates, increasing the efficiency of financial intermediation and cutting the real interest rate on loans. Another measure which could help bring down interest rates would be to allow the application outside the housing sector of funds mobilized in the form of passbook savings accounts, currently the single most important financial asset (da Silva, 1984). This would contribute to reducing segmentation in the financial system and increasing the scope for market forces in allocating financial resources.

A fall in interest rates would provide capital gains to holders of government securities, who are mostly the relatively rich. Including stronger provisions for the taxation of capital gains in the fiscal reform would help increase equity and facilitate maintaining fiscal balance. It should also help convince labor unions to renounce their present implicit claim to a real wage equal to that received immediately after each wage adjustment and accept denomination of wages in the new currency at their mean real value, a critical element of the currency reform proposal.

Monetary Reform: The monetary reform proposal advanced by Arida and Lara-Resende (1985) could eliminate inertial inflation by achieving three basic objectives. The first is to translate the present distribution of real income in Brazil into a set of nominal claims collectively consistent with price stability. The second is to abolish indexation after a short transitional period during which the new cruzeiro (NC) is indexed to the price index in old cruzeiros. The third is to dramatize a change in the macro-economic regime so as to cristalize a change in expectations (Williamson, 1985). It would not eliminate any non-intertial component of inflation due to the non-fulfillment of any of the first three preconditions.

The basic points of Arida and Lara-Resende's proposal are:

(1) The introduction of an indexed money, the NC, with a fixed one-to-one parity with the indexed national treasury bond (ORTN). The ORTN appreciation would continue to be given by the change in the IGP/DI index of the previous month. The exchange rate between the NC and the cruzeiro would be revised daily in accordance with the geometrical interpola-

tion of ORTN values, and the two monies would co-exist during a transition period.

(2) The Central Bank would guarantee the free convertibility between the NC and the cruzeiro at the going exchange rate.

(3) Demand deposits would be immediately converted into NC and thus defended against the depreciation of the cruzeiro, and all time deposits, passbook savings accounts, loans, and all other financial transactions would be made in NC.

(4) During the transition period, the exchange rate between dollars and cruzeiros would follow the crawling peg system so as to maintain constant the exchange rate between the dollar and the NC.

(5) The existing wage indexation scheme, according to which nominal wages increase every six months based on the previous six months' inflation, would not be abolished. It would, however, be possible to opt for conversion of wage contracts in NC, calculating the average real wage in cruzeiros over the preceeding six months and transforming it into NC. Conversion according to this rule would avoid a distributive shock that would be caused by conversion

(6) Rents and all other indexed contracts could be converted to NC at the average real value in cruzeiros over a number of months equal to the adjustment period.

(7) All ORTN contracts could be immediately transformed into NC contracts, and extant nominal contracts would be maintained.

(8) Administered prices set by government fiat would be immediately set in NC. The conversion would be made by the average real price in cruzeiros prevailing over the last indexation period.

(9) The computation of inflation in cruzeiros would continue after the issuing of NC. Inflation in NC during the transition period would, by definition, be nil, unless the inflation rate in cruzeiros accelerated, which would be unlikely, given the free convertibility of cruzeiros into NC and the superiority of the NC in terms of the three traditional functions of money - as a store of value, a unit of account, and a unit of transaction. As the number of prices quoted in NC increased, the very notion of a price index in cruzeiros would become devoid of meaning. Price indexes would be calculated in NC, and the Central Bank would simply fix the rate of depreciation of the cruzeiro with regard to the NC based on the average rate of inflation observed in the recent past to maintain the incentive for conversion of any remaining cruzeiros or cruzeiro denominated contracts.

This currency reform proposal builds imaginatively on a well-established Brazilian institution (the ORTN), which is increasingly being used as a unit of account as well as a store of value under the chronic three digit inflation prevailing in Brazil. The ORTN in effect would also become a unit of transaction. The proposal recognizes that under 100% indexation of wage and other contracts, the indexation period governs the "memory" of the economic system, which is responsible for projecting inertial inflation into the future. For example, under the present wage system, a newly adjusted wage reflects inflation

over the previous six months. There is now a growing movement to reduce the adjustment period to three months, which itself would tend to accelerate the inflationary process. Hyperinflations zero the memory of the system, breaking down the inertia in the inflationary process as the adjustment period is progressively shortened. The central idea of the proposed monetary reform is to shrink the memory of the system without incurring the high economic social, and political costs of hyperinflation.

The same effect could be obtained by a sophisticated wage-price freeze, whereby indexation would be abolished on a given "D day". Wages and prices in cruzeiros would be adjusted to their average real value over a number of months equal to their adjustment period on D day. The disadvantage of this approach is that it would require widespread compulsion and involve losses of nominal income for those whose contracts had been adjusted not long before D day. The monetary reform proposal has a quasi voluntary nature which should make it easier to accept.

The currency reform proposal has stimulated wide debate in Brazil and in international circles. In December 1984 it was analyzed during a major conference on indexation and inflation held in Washington by the Institute for International Economics and on balance well-received (Williamson, 1985). Two major areas of discussion have been the conduct of monetary policy subsequent to such a reform and the political viability of the reform.

The traditional view is that the conduct of monetary policy requires same "anchor" for nominal magnitudes. Either the exchange rate should be pegged, allowing monetary aggregates to adjust passively, or growth of one or more monetary aggregates targeted, accepting the implications for the exchange rate. In the immediate transition period, when the demand for the new money may be expected to grow rapidly given the absence of an inflation tax on it, the exchange rate rule would appear preferable. The government would reap significant seigniorage gains from this non-inflationary expansion in the money supply. Part of the seigniorage gains might be used to reduce the public debt. Once money holdings have adjusted to the level that the public wishes to hold, there is a much stronger case for targeting the growth of the money supply (Williamson, 1985). But a major Brazilian participant in the debate, former Finance and Planning Minister Mario Henrique Simonsen (1984) has proposed a different anchor, the external rate of interest.

In the absence of voluntary capital flows, these could be simulated by relying on another important Brazilian institution, Central Bank Resolution 432, which allows private corporations indebted in dollars to prepay their foreign debt to the Central Bank. There are currently limits on the withdrawals permitted. These limits are intended to control the rate of expansion of the monetary base. But under the Simonsen proposal, which has been adopted by Arida and Lara-Resende, withdrawals of 432 deposits in NC would be allowed at the discretion of the holder and the value of these deposits (which is currently several

times the monetary base) would be included in an "expanded" monetary base. Instantaneous arbitrage between the expected cost of dollar liabilities (namely the external interest rate plus the spreads charged plus the expected probability of real exchange rate devaluation) and cruzeiro liabilities (the domestic interest rate) would hold. The anchor to the NC would then be given by a legal ceiling on the growth rate of the expanded monetary base. An increase in money demand would raise domestic interest rates and encourage an outflow of 432 deposits, but there would be no change in the expanded monetary base. Likewise, an increase in the emissions of NC to finance government expenditure would tend to drive down domestic interest rates, causing an inflow of 432 deposits as corporations borrow on domestic markets. If the net effect on the expanded base is expansionary, it would have to comply with the rule of the permitted growth rate of the monetary base.

A potential problem with this system is that, should a new exchange crisis develop, massive 432 deposits would likely occur as holders of dollar-denominated debt sought protection from exchange risk. This would drive up domestic interest rates sharply (da Silva, 1984).

Doubt has been expressed about the political feasibility of a currency reform along the lines suggested. First, it is argued that the reform is too sophisticated to be easily understood. Second, since the economy that emerges from the reform would be totally unindexed and Brazil has a strong inflationary tradition, there could be a problem in convincing workers and wealth holders that monetary and fiscal policy will in the future be conducted so as to keep inflation absent or at very low levels. Fears of future inflation could make it difficult to establish the social pact necessary for the reform to work, particularly the conversion to NC at the average real value of the previous adjustment period rather than the peak. Finally, the reform has been attacked on the left as a device for permitting the financial system to avoid sharing the costs of stabilization, while exposing workers to real income losses. On the other hand, some bankers are said to fear that the loss of inflation tax revenues on demand deposits associated with a rapid end to inflation. Their long reliance on this source of income has left them with an heavy cost structure.

All these are legitimate concerns. On the first point, while the reform is indeed sophisticated, it does not have to be fully comprehended to be accepted. The ORTN is already used to adjust the value of over 80% of financial assets, and is increasingly used as a unit of account. Workers are used to the erosion of real wages by inflation and to some extent anticipate it by using ORTN-corrected passbook savings accounts to even out real expenditure flows. One approach, suggested by Simonsen (1984), would be to introduce the conversion of wages, rents, other indexed contracts, and administered prices to ORTNs at the average real value of the last adjustment period. The unit of transaction would remain the cruzeiro, but the value of the converted prices would be adjusted monthly by the ORTN index. This could help avoid an acceleration of cruzeiro inflation, which Simonsen fears could occur during the transition period in which the NC is indexed to the ORTN and coexists with the cruzeiro. An acceleration in cruzeiro

inflation, which might be encouraged by the daily announcement of a new exchange rate between the two currencies, would lead to NC inflation during the transition period of somewhat over six months, which would be enough time to convert most contracts to ORTNs.

The problem of creditibility is a serious one, and might best be resolved by allowing indexation of wages and financial instruments after the reform, but with a twelve-month adjustment period and provisions for negotiating the skipping or reduction of an adjustment when real shocks (such as an oil price increase) must be absorbed. This procedure has been successfully introduced in Belgium and Israel. The establishment of an independent Central Bank with a legal mandate for price stability as a part of the financial reform might also help.

The third problem might best be dealt with in the context of negotiations for a social pact. Increased taxation of capital gains and wealth, provisions for post-reform indexation, and a better understanding that the reform is not intended to alter real labor incomes should help, as should a wider awareness that the inflation tax is very regressive. The elimination of inflation tax receipts on demand deposits could be partly compensated for by reducing complusory reserve requirements and mandatory lending at below market rates. Banks would probably have to begin charging for many services now provided free and make greater efforts at cost control.

While all these problems require serious analysis, the currency reform proposal seems to offer the best route to price stability for Brazil's highly indexed economy. History teaches that most inflation that have reached over 200% on an annual basis have ended in hyperinflation and a currency reform. Even if political support cannot be mobilized in favor of this reform in the near future, it may look more attractive if inflation cannot be stabilized or reduced in 1985 and instead accelerates sharply.

CONCLUSIONS

There need be no conflict between successfully completing the economic stabilization and achieving both faster economic growth and increased equity. Designing a coherent economic program to acheives these three basic goals is the challenge facing Brazil's new Government. In this paper I have tried to make the case that the opportunity to do just this exists, and that indeed progress toward the three objectives can be mutually reinforcing.

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CHAPTER 3

TRAINING AND DEVELOPMENT

by

Manuel Zymelman

The recognition of training as an important part of the development process is quite recent. Vocational training was not considered education at all until the rise of mercantilism in the 15th century and in many circles even today it is still haunted by the ghost of Plato's philosophy as expressed in The Laws:

> We speak in terms of praise or balance about the bringing up of each person, we call one man educated and another uneducated, for the calling of a retail trader or of a captain of a ship...the sort of training which aims at the acquisition of wealth or bodily strength...is mean, illiberal, and is not worthy to be called education at all.

Education for virtue or citizenship, is good; but that intended solely for economic purposes is suspect.

Historically, the perception of training as a factor in economic development followed cyclical patterns. Mercantilists considered training and education to be the cornerstone of well being. "Art" - a synonym of what we call today education and training - increases the natural wealth of a country by contributing skills and vocational know how. In the words of William Petty, a major mercantilist figure, "the glory and greatness of a Prince does not depend on the extent of his territory but rather on the number, art, and industry of his people."

Human resources, Petty claimed, are really more important than natural resources for the simple reason that by incorporating skills into resources, a nation can export something renewable and inexhaustible rather than resources subject to depletion and growing scarcity. It is, therefore, in a nation's interest to develop and protect its human resources. Other writers such as Grey, Postlethwaithe, Steuart and Hume in the mid 18th century advocated training as the best way of increasing productivity in agriculture and industry and fostering higher incomes. With the advent of the classical economists, however, the pendulum swung back. Education and training ceased to be an indispensable factor in economic development. Classicists, as exemplified by Ricardo, saw no reason to be concerned with the supply or character of labor. The strategic element became physical capital, in spite of Adam Smith's injunction that "the improved dexterity of a workman may be considered in the same light as a machine or investment of trade which facilitates and abridges labor."

In the latter part of the 19th century, mercantilist ideas were again revived. The spur was provided by industrialists and continental

political economists such as List and von Thunen, who thought that technical education and vocational training were needed to increase productivity. Most well known technical institutes of today have their origin during that period. The idea that there was a need to develop skilled manpower swept not only Germany, France, the United States and England, in that order, but also Japan, which during the Meiji reformation focused on the development of its human resources to industrialize in a relatively short time.

The interest of economists in training abated until after the Second World War, when two major events drove home the point that human resources are the key to successful development. On the one hand, the Marshall Plan revealed that destroyed economies can bounce back in a very short time if the human infrastructure is available. On the other hand, developing countries as well as international lending institutions learned the hard way that it is not enough to provide machinery and equipment to increase production, that unless the physical capital is accompanied by technical skills the aid effort may be wasted. Accompanying these events were the pressures brought on modern society by the unprecedented rate of technological advances. Rapid technological change required changes in the skill composition of the labor force, the abolishment of old skills and the creation of new ones — events which produced dislocations in labor markets and, in many cases, created structural unemployment problems.

Now, the problems have become more acute. The spring of technical progress has become a torrential flood which presents developing countries with challenges unlike those faced by developed nations during their industrialization. If developing countries are to participate in international trade and bridge the ever widening technological gap, education and training will have to play a bigger role than they once played in the 19th century in the developed countries. To better understand the role that education and training could play in narrowing the technological gap, we must look at the relation between technological progress and education and training, both formal and informal.

TECHNOLOGICAL PROGRESS AND ITS RELATION TO FORMAL AND INFORMAL EDUCATION

Technological progress influences the educational system by modifying the occupational structure of the labor force and the skill content of occupations and by producing changes in the social structure.

The introduction of more modern methods of production induces changes in the composition of the labor force used in production. For example, initially the appearance of the factory system and mass production brought about an increased demand for semi-skilled workers to tend an assembly line and perform repetitive routine tasks. At the same time it eliminated the demand for some specialized crafts. The blacksmith was supplanted by the welder, the telephone operator has been replaced by a taped recording. Innovations have also created a variety of new jobs never in existence before: the computer programmer, the key punch operator, the space engineer and so on.

Current with increased prosperity brought about by the technological progress has been an ongoing process of change in the patterns of consumption of goods and services. As income goes up there is a relative increase in the consumption of durable goods and services and a relative decrease in the consumption of food and other necessities.

A change in the pattern of consumption also produces a change in the occupational composition of the labor force. If a country produces mostly agricultural products and clothing, its labor force will have a completely different structure than the labor force in a country that produces engineering products and electronics. This change occurs regardless of the level of technology used in either case.

The combined effect of the introduction of new production techniques and the change in the consumption of the population due to higher incomes is, in general, to increase the demand for better skilled and more educated people and decrease the demand for the unskilled and uneducated.

In the last decades this process of change in the occupational structures has been accelerating, especially in the developed countries where automation and robotics have been introduced. Automation has been defined loosely as the use of machines to run machines. But automation is more than that. It involves a whole system of production whereby the machine takes over not only some of the motor functions of production but also the decision-making functions of the operator as well.

The introduction of the computer that performs routine logical decision-making tasks at astonishing speeds was, and continues to be, a major factor in the advancement of automation and is making reality of undreamed possibilities.

The introduction of machines and computers, however, has not been the only factor contributing to a great leap forward in automation. A remarkable change in the organization of enterprise and the appearance of new types of institutions have all been part of a new system of production.

The increasing sophistication of industry has been accompanied by the growth of Research and Development Centers, which provide a link between industry, the university, and government.

The gap between theoretical principles and their practical application has also narrowed, cutting the time-lag between innovation and invention more than in half. Whereas in the 19th century inventors were usually single isolated individuals, today they often gather in organizations, where they can work together in an interdisciplinary effort to solve specific problems.

Automation and robotization also markedly change the content of jobs. The need for theoretical knowledge has increased, less physical effort and slower reaction time are required of workers to perform an operation, precision is being supplanted by instruments. Where a "high

degree of skill" once meant manual dexterity, it now often means a formal higher education and technical training coupled with the ability to control and repair the machine and a capacity to perform both manual and mental tasks. The complexity of equipment and its high cost imposes greater responsiblity and calls for a better understanding of the production process and the ability to communicate in writing to assure continuity of operations and to evaluate results.

With the increase of automation, workers are also beginning to take on additional tasks, both those relating to their immediate occupation and, later, those of quite a different character. This broadening of occupational profiles is accompanied by a deepening in the knowledge required for each aspect of an occupation.

All these new requirements for the new occupations, or changed old ones, exert pressure to change the structure of the institutions that provide training. Until recently, apprenticeship and informal training were the main avenues to most manual occupations, which were filled by the bulk of the labor force. Through imitation and association with the "master" frequently in his home, an apprentice learned the skills of the trade as well as appropriate social behavior. The content of the craft, theoretical and practical, was determined by the members of the trade group, who also controlled entry into the occupation. Craftsmen were not confined to becoming narrow specialists, but, like members of the elite, were supposed to possess a wide range of skills that allowed them to deal with a variety of functions.

With the beginning of mass production came a diversification of functions and specialization, the creation of non-craft trade unions composed of semiskilled workers, the increase of supervisory jobs, and specialization in the management functions. Formal education was fostered by trade unions which wanted to provide their members with a means for economic progress, and by those who saw in education a social investment that would contribute to social peace and civic order. Vocational training was also provided to supply some of the specialized skills. Secondary and higher education were geared to a small elite that was to furnish the professionals and administrators for government, business and the army. But until recently, informal training was the major element in education for employment.

In the past economic and social development has been associated with a system that gave priority, social and economic status, and political authority to those with "genuine" (formal) education, while relegating manual workers to an inferior status. This dichotomy has existed throughout history.

Historically, schools provided a general type of education to enable students to further their education in higher institutes of learning and to help them in their social adaptability. Training for the world of work was left to industry and to some types of formal vocational training. In general, formal education was considered general education, and vocational training a necessary but not altogether desirable type of special education. The reasons are obvious: secondary schools in most countries act as a selective mechanism, and those lucky

enough to be selected to go on to the universities become the leaders in industry, business, government, and educational systems. Under these conditions the quality of the schools is determined more by the high quality of selected students than by the content of the curricula. Employers, in turn, tend to hire the carefully selected, well educated but inappropriately trained over those who are, perhaps the less able, but who do have a very relevant and specialized training.

As a result of this situation, vocational training has suffered and has generally been low caliber. The students have traditionally been those who have been rejected in the academic stream. The teachers often have been poor with low general educational levels, and the attitude of the public toward vocational training has been apathy.

These conditions proved adequate to satisfy the needs of a world where change was slow. In a world of rapid technological progress, they are not satisfactory and are now changing. Formal schooling, once limited to an elite, is becoming more and more universal. What was once an institution for training people for high status jobs, is now becoming an avenue for training for most jobs. As these changes occur, differentiation and specialization are being postponed and the majority of the students are coming to share a common educational experience. This common experience, however, has to be broader than the general education offered till now. If children are to see a relationship between their studies and their future work, general education will have to include elements of vocational training which is as important to our industrial technological society as the arts were during the period when the Renaissance was the major cultural touchstone. All in all, then, education will have to go beyond narrow academic concerns to include study of areas that have traditionally been outside the academy. It will have to offer a variety of alternatives to those who by their intellectual abilities, interests, and social and cultural background cannot profit from a prolonged general education.

But to make what was known as "vocational curriculum" part of general education is an extremely difficult task. It can come about only if teachers, educationists, and the public at large are convinced that education does not mean studying only certain traditional subjects. Education is the organization of knowledge, and there is a tendency to emphasize one type of knowledge at the expense of another. The inclusion of more subjects oriented towards occupations, that is the broadening of curriculum, will necessarily involve displacement of some academic curricula. This can only be done successfully if people perceive that the trade off is worth while. The problem, however, can be resolved if it is made clear that vocational disciplines can be useful vehicles for learning a variety of quantitative relationships and problem solving processes, while the more general parts of the curriculum can provide instruction in those skills needed to adapt to society and the world of work. Although the problems of creating an integrated vocational and academic school are formidable and the drawbacks are many, the advantages that would be derived from successfully bridging the gap between the two cultures are too great to ignore.

The impetus to closing this gap is fostered and aided by the

changing character of labor requirements. The number of jobs needing less physical ability and more flexible mental abilities are increasing. Job content is shifting away from repetitive tasks and toward more executive actions, such as those requiring theoretical knowledge and the intellectual flexibility to adjust to unforeseen changes. The skills needed for specific jobs are also likely to change many times during a worker's lifetime, requiring that worker to be adaptable. Finally, jobs are becoming more inter-related, which calls for a broad base of training which is suitable to groups of skills and abilities and which point up how skills can be transferred.

The implications of these changes is that in an era of automation, education cannot be called general if it excludes vocational education and that the content of curriculum must concentrate on promoting intellectual flexibility, transferability of skills, and adaptability to change.

In view of the grave problems stemming from effects of technological change and in view of the particular conditions of labor markets in developing countries, it might be profitable for these countries to think of new approaches to education and training rather than try to copy the old patterns of the developed countries.

Educational planners who think of education in terms of schools and the place of work in terms of production might find it useful to combine these separate concepts. We must think of the place of work as an educational institution and view formal schooling as a instrument for preparing people for productive occupations.

Economists who most times advise educators to train people for occupations based on present comparative advantages might find it more useful to advise educators to train people in ways that will help them close rather than widen the technological gap so that they may change present comparative advantages.

What kind of institutions can effectively combine productive units with education, what types of training should be offered for narrowing the technological gap are questions whose answers can be left only to those with bold imaginations. But for developing nations, where the pace of change is outrunning the ability of training systems to adapt to new realities, there appears to be little choice but to try new approaches.

CHAPTER 4

THE ORGANIZATION OF THE BRAZILIAN SYSTEM

by

Morris A. Horowitz

For a generation, Brazil has pioneered in the development of a mixed public-private vocational training system (SENAI and SENAC). This system has paralleled the traditional technical education offered by the public schools. Nevertheless, during the rapid economic growth of the 1970's, the vocational education system, quantitatively and qualitatively, was sluggish in responding to the requirements created by the economic expansion. The reaction of education and training organizations to changes in the labor market has always been slow, with a substantial lag in output, especially in free market societies. Where central economic planning takes place, one tends to find that there is some integration of planning of education and training with the overall national economic planning.

Such integration of vocational planning with that for the economy as a whole apparently was not occurring in Brazil -- or at least it was not occurring in 1979. At that time, national economic planning was the responsibility of the Secretariat of Planning, while the analysis of labor markets and of vocational training was performed in the Ministry of Labor. In December, 1979, Professor Gustav Schachter and I were invited to Brazil by the International Labor Organization to study and analyze the relationship between the government economic planning agencies and agencies with responsibility for planning vocational training. The purpose of such a study was to recommend a structure for the labor market analysis function so that the Brazilian National Vocational Training System would become a viable, effective system within the context of national planning. At that time, the first two National Economic and Social Development Plans had set sectoral targets but had not specified, aside from investment estimates, the specific resources needed to attain the objectives. No organization within the Planning Secretariat or any other government agency formulated policy and planning for the supply of trained workers with the skills needed by the growth sectors of the country. The following is a brief summary of our report.

Interest in vocational training in Brazil dates from the beginning of the century, but it was in 1942 that SENAI, the National Service for Industrial Apprenticeship was created by law. SENAI is financed by a government payroll tax of 1%, paid by employers, and the funds are used to promote vocational training for industrial workers. Nationally, SENAI administrates and operates six technical Training Institutes, and at the state level, it runs a network of vocational training centers. In 1946, the National Services for Commercial Apprenticeship, SENAC, was started on the same basis as SENAI.

In 1970, the traditional public school system of Brazil provided more than one-half of the national training, while SENAI and SENAC trained an additional 40%. In addition, there were and are a large number of private training institutions offering short courses within the scope of vocational training.

The Brazilian government plays an important role in vocational training. In the Ministry of Labor, there are three secretariats that are apparently relevant to vocational training: Secretariat of Manpower; Secretariat of Labor Relations; and Secretariat of Employment and Wages. The Secretary of Manpower has prime responsiblity for determining the training needs for the economic and social development of the nation and for implementing the various policies and programs. Some newer programs, managed by the Ministry of Labor, are also involved.

In 1963, an Intensive Program for Manpower Training was introduced for workers not covered by either SENAI or SENAC. This program (PIPMO) promoted short training programs, especially for workers who need additional training. In 1976, the National Service for Rural Vocational Training (SENAR) was created, and the Ministry of Labor also manages Law 6.297 of 1975, which promotes in-plant training by employers through an incentive of income tax deductions.

To integrate all vocational training programs, the Brazilian government in 1976 established the National Vocational Training System, which was designed to coordinate the activities of all institutions concerned with vocational training. The goal was to establish a national system of human resource development. The System is under the jurisdiction of the Federal Council of Manpower, which is chaired by the Minister or Labor, or his representative, with the participation of representatives from public and private institutions concerned with or operating in the field of vocational training.

On December 31, 1979 the second 5-year Economic Social Plan was completed, and the third plan (1980-1985) took effect, even though the plan consisted only of a general statement without statistical support and justification. The planning organization, the Secretariat of Planning (SEPLAN), is directly under the President of Brazil and has the responsibility for coordinating all planning activities and developing policies for social and economic development.

The Secretariat of Planning contains three autonomous foundations: the National Center for Research; the Institute of Statistics; and the Institute for Economic and Social Planning (IPEA). Within this latter organization is the Planning Institute (IPLAN), which coordinates the planning process and has responsibility for drafting the plan. This unit contains four coordinating units for the development and construction of the plan: (a) general planning; (b) sectoral planning; (c) regional planning, and (d) the National Center for Human Resources (CNRH).

For an economic plan to project growth and development with reasonable success, it must contain a well-formulated subplan for human resources. Human resources are a vital factor in the growth and development of an economy. Whether the occupational needs of the economy are to be met can only be determined by a plan for the supply of trained human resources, that is, vocational training. While it is possible to develop an economic plan without any consideration of the occupational needs of the growth sectors of the economy, such an approach risks gross mismanagement, economic waste, and structural unemployment. Few economies can afford such a risk. Planning of vocational training is a necessity for the growth and development of an economy. The linkage between the government agency responsible for vocational training planning and the agency responsible for overall economic planning must be strong. Planning of vocational training should be an integral part of the manpower planning agency; and the agency involved in overall manpower planning must play a key role in the development of an economic and social plan. Since all aspects of a plan must fit together and be integrated, the estimated unavailability of labor at the target date could force a change in the economic plan. An internally consistent plan requires an iterative process, in which each segment of the plan is constantly being revised until all parts are internally consistent with the overall plan.

If the formulation of a general plan is to work, the government units with responsibility for drafting the various sections of the plan must all be at the same hierarchical level in the structure of the planning organization. Each of these units must have equal access to the next higher level of policy makers in the structure, and each must be in a position to obtain the information needed to formulate its segment of the plan.

If we focus on the labor market information needed for planning, the basic source must be the Ministry of Labor, which should have the responsibility for furnishing all needed labor market information to the Ministry of Planning. And once a plan has been officially adopted, it is incumbent upon the Ministry of Labor to facilitate the execution of the plan where labor is involved. One major responsibility is implementing the vocational training plan, which means making sure that the goals and targets of the vocational training plan are met. A second major responsibility is administering the employment service system so that those seeking employment in the local markets are matched with the available jobs.

The organizational structure that existed in Brazil was full of defects. In overall planning there was little horizontal and vertical communication, and a sparse flow of information. There was no link between state plans and national plans in either direction. Despite the existence of a Center for Human Resources in the Planning Institute, there existed no planning for human resources, and there was no direct linkage with the Federal Council or Manpower which was related to the Labor Ministry. In summary, there appeared to be no attempts in the planning organizations of the government to plan and project the human resource needs of the industries for which economic and social

plans were being developed. There was no coordinated effort to develop the projected demand for manpower at different skill levels.

On the supply side, vocational training was delivered by SENAI and SENAC, by the public sector through its educational system, and by the private sector through a variety of training institutions and on-the-job training in private firms. However, the Secretary of Manpower had no guidance on the coordination of these activities. While informal relationships were maintained with the Ministry of Labor, the various training organizations were free to develop their own plans and their own training programs.

RECOMMENDATIONS

The following are the basic functions relevant to the development of an economic-social plan as it relates to manpower:

1. General planning
2. Sectoral planning
3. Regional planning
4. Human resources planning
   a. Manpower requirements of economic plan
   b. Other aspects of human resources
5. Translating manpower requirements into training requirements
6. Developing a vocational training plan
7. Developing a national vocational training system
8. Evaluating vocational training programs

In broad terms, the first four functions should be performed in the Planning Ministry, while the last four should be performed in the Ministry of Labor. In the Planning Ministry the unit charged with Human Resource planning, the National Center for Human Resources, should be on an equal footing with the other planning units, and this means that human resource planning should be recognized as an integral part of the economic-social plan. The National Center for Human Resources must have a firm commitment to manpower planning and it must really believe that manpower planning is an integral part of economic and social planning. In 1979 this unit did no planning, and did not even participate in the planning process.

In the Ministry of Labor, the role of the Federal Council of Manpower is critical. Established by Order No. 553 on October 20, 1976, the Federal Council is a policy organization within the Ministry, reporting directly to the Minister. The Federal Council should determine how the National Vocational Training System should be organized, how it should function and what its policies should be to carry out the manpower policies as specified in the Economic Plan. The Federal Council should be chaired by the Secretary of Manpower and consist of representatives from the various ministries and from the various organizations involved with vocational education.

Within the Ministry of Labor, the Secretariat of Manpower is the critical unit. This Secretariat should have responsibility for all research on the labor force and labor markets. It should coordinate

all information from the various organizations represented on the Federal Council. It should develop a labor market information system that would provide the basis for analyzing the manpower needs of the major labor markets of the economy. It should, evaluate the National Vocational Training System on a regular basis and conduct follow-up surveys of completers of the system.

Given the large amount of unemployment and underemployment in Brazil, one could argue that manpower planning and vocational training planning are largely unnecessary because the labor market will readily respond to the manpower needs of industry, at least in the short run. This is the argument we heard at the Planning Institute in Brazil in 1979. However, there is a strong tendency for training institutions to use the same instructors and the same equipment to train for the same occupations long after the demand for these skills has declined or disappeared. Planning can break this tendency. One of the more important features of indicative planning is that of informing business and training institutions of expected trends in the economy. With such information operational organizations could prepare instructors and equipment more efficiently and then respond rapidly to the forecasted changes in, and demands of, the economy. To achieve this, however, it is necessary to have formal links among the economic and social planning units and the vocational training units, and a swift flow of information among all the actors in the system.

CHAPTER 5

EVALUATION OF CURRENT VOCATIONAL TRAINING IN PROGRESS IN BRAZIL

by
Antonio Ferreira de Andrade, Eloysio Rodriguez da Silva, Francisco Jose Abreu

During its forty-two years of existence, SENAI, the National Service for Industries and Apprenticeship in Brazil, has stressed the important role that education plays in the world of work. The organization has had its successes and its failures but has been and will continue to be dedicated to its major objective: to find new and better ways to provide a sound general education on which the specific education related to a trade must be built. SENAI is also aware of its responsibility to develop the individual potential of its students and to help those enrolled in its Vocational Training Centers to fill a useful role in society.

For these reasons, SENAI constantly seeks to improve teaching methods by updating machines and tools and, above all, by preparing its instructors well. Consequently, SENAI has given great importance to "the continuous evaluation of processes and results of its programs."

It is not enough, however, simply to analyze the internal factors that make up the process of education or of vocational training. It is also necessary to consider external variables to determine whether vocational training programs are sufficient, adequate, and coherent to meet:

the internal aspirations of the participants, making them confident that they really know and are able to put in practice all, or at least a major part, of the knowledge and skills acquired at school; and

the real skill requirements of the labor market.

SENAI has tried to assure that its programs meet these goals by performing numerous evaluation studies as indicated by the various topics covered in this Chapter.

To give the reader an idea of the dimension of current efforts made by SENAI in evaluating vocational training programs it is necessary to understand the national vocational training system; the economic and social realities faced by Brazil today; and the ways in which vocational training organizations in the country have acted in an effort to adapt themselves to these particular times. Since the evaluation process is part of the planning system, it is also helpful to be aware of the evolution of the planning system at SENAI.

In the following pages several of these areas will be discussed. We have also summarized the results of several evaluation studies carried out by the Regional Department of SENAI in Sao Paulo and have described a Japanese evaluation system based on macro analysis, which gives a more precise notion of the important role played by vocational training. As will become evident, vocational training is part of a very complex socioeconomic system with links to many are as in the total society.

THE NATIONAL VOCATIONAL TRAINING SYSTEM

The Brazilian Government plays an important role in vocational training. In the Ministry of Labor there are three secretariats that are relevant to vocational training: the Secretariat of Labor Relations (SRT), the Secretariat of Manpower (SMO), and the Secretariat of Employment and Wages (SES).

The Secretary of Manpower is responsible for determining what training is needed for the economic and social development of the nation. The SMO utilizes information on economic projection to design vocational training policies and specific programs, which are implemented through government units within the Labor Ministry and through non-government organizations indirectly influenced by the Labor Ministry, such as SENAI and SENAC (National Commercial Training Service). The Ministry of Labor also manages the National Service for Rural Vocational Training (SENAR), and the Law 6.297 which provides Fiscal Incentives to enterprises that offer Vocational Training to their employees. (See Charts 1 and 2).

In 1976, the National Service for Rural Vocational Training, SENAR, was created. The Ministry of Labor finances and monitors the program, but SENAR's regional organizations have administrative autonomy. The Ministry of Labor, in cooperation with the Ministry of Agriculture, is in charge of analyzing the rural labor market, suggesting training needs, and evaluating programs. Training is based mainly in mobile units. SENAR primarily uses instructors from the Ministry of Agriculture, but it also hires instructors directly.

The Law 6297 of 1975 provides for in-plant training by employers with incentives provided by income tax deductions. The employers on their own, through some 900 private training institutions, SENAC, and SENAI, conduct programs aimed at preparing workers through apprenticeship, technical training, specialization, and upgraded courses.

To integrate all vocational training programs, the Government established the National Vocational Training System, SNFMO, in 1976. (See Chart 3) This system attempts to coordinate the activities of all institutions concerned with vocational training and has as one of its goals the establishment of a national system of human resource development. The System is under the jurisdiction of the Federal Council of Manpower (CFMO), chaired by the Minister of Labor or his representative. Participants are representatives from public and private institutions concerned with, or operating in, the field of vocational training.

The members of the Council are:

1. Secretary of Manpower of the Ministry of Labor, president.
2. Director General of SENAI, permanent member.
3. Director General of SENAC, permanent member.
4. Director General of SENAR, permanent member.
5. One representative of the Planning Ministry.
6. One representative of the Ministry of Education and Ministry of Finance.
7. One representative of the Labor Union and of the Employer's Union.
8. Three Vocational Education experts.

One of the most important accomplishments of the Council was the elaboration of the National Policy of Vocational Education (NPVE), which was accepted in common consent by the institutions of the NSVE. In 1983, State Councils were established in several states consolidating vocational education at the state level.

A study for the ILO conducted by Professors Horowitz and Schachter shows that the CFMO could possibly improve its work if adjustments were made in the flow and organization chart of the Council.[Horowitz and Schachter] Chart 3 shows the linkages of the SNFMO. Some are effective, some are relatively ineffective, and others are non-existent.

BRAZILIAN SOCIAL REALITY

The total Brazilian population in 1980 was 124 million and by the year 2000 it is likely to be 203 million. The population between 15 and 59 years of age will be 108,500,000, and the projected vocational training programs for the three economic sectors will cover only 7.5% of this population. If only the working population of 75 million is considered, the capacity of vocational training programs will be 9.1% of this working population.

According to the Census of 1980, income distribution is worse now than it was in 1970. The Gini Indices for 1970 are 0.568 and for 1980, 0.586. This is very high in comparison to similar data for other developing countries, where only in rare cases are the indices over 0.55. It is well known that one possible way to correct the imbalance in the income distribution is to promote social programs related to education in general and to technical education in particular.

Currently, Brazil appears to be totally committed to transforming the country into a modern industrial society based on a more equitable distribution of income. The ultimate goal is to help every citizen achieve material as well as cultural satisfaction.

To achieve this aim, it is imperative that Brazil improve the quality of its human resources and develop more fully its natural resources. It must also forge a new relationship between science, technology, and politics if aspirations are to be translated into reality. Finally, it must overcome a variety of obstacles: the energy

crisis, the continuous currency devaluation, the balance of payments deficits, and external technological dependency.

At this point in Brazil's development, it is clear that, if the country is to reach its economic and social targets, it must have more international cooperation to achieve self-sufficiency in terms of energy and technology. At the same time, to be self-sufficient the country must develop more fully its own human resources. While formal education and vocational training are generally recognized as key to such development, the lack of financial resources to support the continued operation of vocational training centers has led to their underutilization. As a consequence, many youngsters and adults are unemployed and underemployed. As in many developing countries, this situation has brought an increase in social problems, which are further exacerbated by the lack of social security for the unemployed in Brazil.

The only feasible way to break this vicious circle is to support education at all levels. The successful experiences of developed countries in the fields of economic policy and vocational training will need to be studied, analyzed, and finally adapted to meet the needs of Brazilian society.

SENAI'S MAIN POLICIES

Because of significant structural changes in the economy, it is difficult for SENAI to be confident about current plans. Since the early 1970's, as a result of the energy crisis, Brazil has had accelerating rates of inflation. As a consequence, production has declined in recent years, and unemployment rates have risen. The unemployment rate increased even more after 1980, reaching about 7% in 1982 and 1983. This represents more than 3 million unemployed persons. This situation creates a difficult problem not only for the whole society but also for SENAI. Rising inflation has meant a serious decline in SENAI's annual budget in real terms. Between 1971 and 1980, for example, SENAI's budget had an annual rate of increase of 10.5%. Between 1979 and 1983, however, it experienced a loss of 44%.

To help alleviate the current financial crisis, the government has been trying to find new export markets and has been calling on SENAI to perform new tasks that will help achieve this end. The main guidelines adopted by SENAI are the following:

a. Give priority to Mobile Units

These types of units provide vocational training for those living in distant regions lacking Vocational Training Centers. As a result of a loan from the World Bank and an agreement with the Ministry of Labor, SENAI has acquired eighty-six new mobile units, which offer courses related to several industrial trades identified as being most in need in a specific region.

b. Modernize Vocational Training Centers

Because SENAI has been in operation for forty-two years some of the older VTC centers must be given new equipment. In some cases,

training also must be reassessed in light of new labor market needs.

c. Establish new mechanisms for planning and control of SENAI's production

It is necessary to establish ways to disseminate relevant information to all the regional departments of SENAI through the Data Processing Center.

d. Develop research and evaluation studies related to the apprenticeship program and to the Skill-Training Program

These studies are very important considering that at the present time it is necessary for SENAI to identify new programs and to introduce changes that will allow maximum efforts to be given to adapting courses more closely aligned to labor market needs.

e. Give special priority to the Program of Human Resources Development of SENAI personnel in accord with the concept of "continuing education."

This program will be directed mainly to SENAI managers at all levels and will attempt to create new administrative skills and behaviors in keeping with current realities. The program will be a key activity of SENAI during this industrial recession.

f. Give higher priority to small and medium enterprises

This program is intended not only to train personnel but also to offer technical assistance at all levels. The program is very important because of the great number of small and medium enterprises and their role in creating new job opportunities.

g. Give priority to social programs targeted at low income groups

This program will be developed in accordance with the agreement signed with the World Bank and the Ministry of Labor.

EVOLUTION OF VOCATIONAL EDUCATION PLANNING

A recent study by Ammann and Floutsacos traces the evolution of vocational education planning.[Amman and Floutsacos] In the 1960's several theories of educational planning were developed and a controversy emerged about the usefulness of such planning, with some scholars objecting strongly to the activity. Stein, for example, stated that planning was a "Loch Ness Monster".[Stein] Most of the controversy, however, did not deal with the desirability of planning, but rather with many theoretical models and techniques.

It has been said that "education is a public good... arising whenever some segment of the public collectively wants and is prepared to pay for a different bundle of goods and services than the unhampered market will produce."[Steiner] Since, however, clear market signals provided by supply and demand forces do not exist for public goods, it is necessary to estimate the demand. Estimate can be made by several

approaches:

- The fixed requirements approach used by Parnes, Tinbergen and Bos, and Eckaus treats the requirements of educated manpower of different types at a given time as a function of the level and sectoral distribution of output. The Mediterranean Regional Project, sponsored by the OECD, largely uses the fixed requirement approach.

- The rate of return approach, which has been applied by Becker, Harberger, and Blaug among others is based on estimates of the costs and benefits of education. The latter benefits are measured by the marginal product and thus, in a neoclassical model, by the factor price of the resource in question. Future earnings and costs are discounted to their present value and if the net present value is positive, the educational project is considered worthwhile.

- Linear programming models that consist of maximizing some objective function that depends on educational decisions subject to constraints which specify what educational decisions are permitted and what are not feasible. Adelman and Bowles are among those who have applied linear programming.

- The international comparison approach used by Horowitz, Zymelman, and Herrnstadt compares the occupational structure of industries in nineteen countries. The Quantitative Indicators of Human Resource Development elaborated by Harbison and Myers compares the relationships between GNP and postprimary educational attainment in seventy-five countries.

- Finally, there is the social demand approach. According to Cohn, this means that "instead of concentrating on the potential demand for manpower - hence for educational services - by industries, one might want to plan the educational system so that the projected demand by students for places in the various levels of education is met." (11, p. 320)

The most comprehensive criticism of these different approaches is given by A.K. Sen. [1968 and 1970] who claims that models are "first approximations" and suggests many "changes". Many critics refer to possibly misleading interpretations of such models or to missing elements in the methodologies.

The best way to approach educational planning is a multidisciplinary one. Instead of choosing one approach as opposed to another, Blaug proposes the application of several approaches. The contributions of other disciplines--sociology (of education), administration (of personnel), psychology (industrial and of education), education (especially vocational), and anthropology (cultural)--have to be considered a dialectic, synthetic, participative form, not just in a descriptive or antagonistic manner.

In summary, as we pointed out in "Planejamento da formacao profissional" and as is revealed by the definition given in a previous section of this paper, vocational education is a highly complex activity, essentially related to many other disciplines. Hence planning of such pro-

grams must take into account non-economic constraints, such as political and behavioristic constraints, as well as occupational and educational aspirations.

PERSPECTIVE FOR THE FUTURE: A BIG CHALLENGE FOR THE PRESENT

The vocational and technical school cannot be indifferent to changes which are likely to occur in the world of work. In fact, many think that school should lead, preparing youngsters and adults to adjust to new work places which are likely to emerge as a result of technological innovations. Certainly, the school must be aware of and able to adopt to current realities if it is to be identified as a source of education for life. As Pierre Furter has remarked in his study Education and Life:

> In order to correspond to the hope of the present time and answer the requirements of an authentic education, the educator must accept the risk of introducing in the continuity of the educative action the discontinuity of time. [p. 49]

The amount of work necessary to achieve these ends over the next ten years is indicated by Chart 4. From 1975 to 1980, vocational enrollment accelerated. The high rate of increase was caused by the on-the-job training programs, which were encouraged by fiscal incentives given to enterprises by the Ministry of Labor under Law 6297. The enrollment projection for the year 2000 is based on historical data (linear projection) and on expected population growth between 15-19 years of age. Chart 5 shows that by 2000, assuming that there will not be drastic changes in technology affecting skill requirement and also assuming that the rate of growth will be uniform, demand for vocational education will more than double.

Chart 5 presents a forecast of vocational training enrollments as well as training to be covered by SENAI to the year 2000. To be able to respond to this projected rate of change, it is clear that SENAI, SENAC, and SENAR will have to increase their operational level of efficiency over the next several years. Charts 6 and 7 show the general structure of planning at the national and the regional level. Finally, Chart 8 shows the evolution of planning at SENAI for the last twenty years.

EVALUATION OF TRAINING PROGRAMS

There are alternative ways to approach the evaluation of vocational training. A structure that has been used by SENAI to evaluate the efficiency level of its whole system is as follows:

$$\text{Output } (y) = f[(CR, HR, OT, PT), EF]$$

where CR = Capital resources
HR = Human resources
OT = Organizational technology
PT = Production technology
EF = Social factors

To elaborate the output chart, we try to define which of the three levels of approach we intend to use in the evaluation.

A) Inner - Program evaluation
B) Inner - System evaluation
C) Induced effects evaluation

At each of the three levels, we try to define the criteria and the indicators to be used according to the following blocks:

A) Inner Program
- Availability of Resources (capital, human etc.)
- Utilization of Resources
- Quantitative Results
- Qualitative Results

B) Inner System
- The influence of environmental factors.
- The effects of the program in the school system.
- The influence of the program on other vocational training activities.
- The influence of the program on the economic environment.
- The influence of the program on the social environment.
- The influence of the program on the administrative and institutional environment.
- Repercussions of the program on the external environment.

C) Induced Effects
- Indirect social effects.
- Indirect economic effects.

In addition to the factors discussed above, there are other difficulties encountered in making a good evaluation of vocational training programs. At this point, then, it might be useful to remember some important remarks made by Manuel Zymelman:

- It is difficult to find a meaningful solution to the problem of vocational technical education without analyzing the whole system of education.

- It is difficult to design efficient training without clear policy as to the purpose of the training.

- It is counterproductive to look for the "best" solution where there are many constraints. A second or a third "best" will lead to better results. [See Chapter 3 also]

Chart 9 shows the main variables taken into consideration in the evaluation of vocational training programs of the Regional Department of Sao Paulo.

A COMPARATIVE TRAINING PROGRAM EVALUATION: BRAZIL AND JAPAN

In 1981, SENAI conducted a comparative analysis of vocational

training in Brazil and Japan. To evaluate the level of efficiency of such programs, it was necessary to determine the relationship that exists in each country between vocational training and the economy, labor, and education. Ten indicators were selected for each variable. The indicators were evaluated according to the following criteria: international comparisons, average performance at a given time, comparison of quantitative factors in the two countries. Scores on these indicators were then placed in the categories A, B, and C:

A. Equals best performance, that is, above average:

B. Equals average performance;

C. Equals below average performance.

Each category carried with it a weight: A = 6; B = 3; C = 1 which was then allotted to the indicator. The selection of the indicators was made according to their importance and to the availability of information in the two countries.

To obtain the performance of each factor--economy, labor, education, vocational training--we calculated the medium weight. Assuming that the ideal performance of each factor would be six (excellent performance) times ten units, that is, sixty points, the country's ideal general performance in all four factors, would be 240 points. Thus, the final performance of each country will correspond to the medium weight of the four factors.

These results were then related to the "social impact" of these factors on the population of each country. To make this calculation we combined four factors into two groups and added the points of each factor.

Total number of points of the factors in the two countries are:

FACTORS	JAPAN	BRAZIL
Economy and labor	97	44
Education and vocational Training	77	48
TOTAL	174	92

In light of these results, we can infer that a solution to the problems in vocational training is to a large extent closely linked with other factors. Our final objective is the adjustment of a man to his society, thus giving him the capacity of "LEARNING TO BE." To achieve this objective we will need to make the necessary corrections first in the economic sphere since it presents the most pronounced limitations (the performance of the Brazilian Economy 32%), and then in Education in general (the performance of Education in Brazil 37%). As a result of these corrections, coupled with specific accions in the other two spheres, - labor (42%) and vocational training (43%) we should be able to achieve our objective of assisting our citizenry to adjust to the Brazilian society.

As we look at these two different cultures, we discover many common problems especially in the area of vocational training. In Japan, however, most of the problems may be easier to overcome because Japan has access to both INFORMATION and to a Vocational Training Plan and are able to make quick adjustments in the whole system to reach desirable targets.

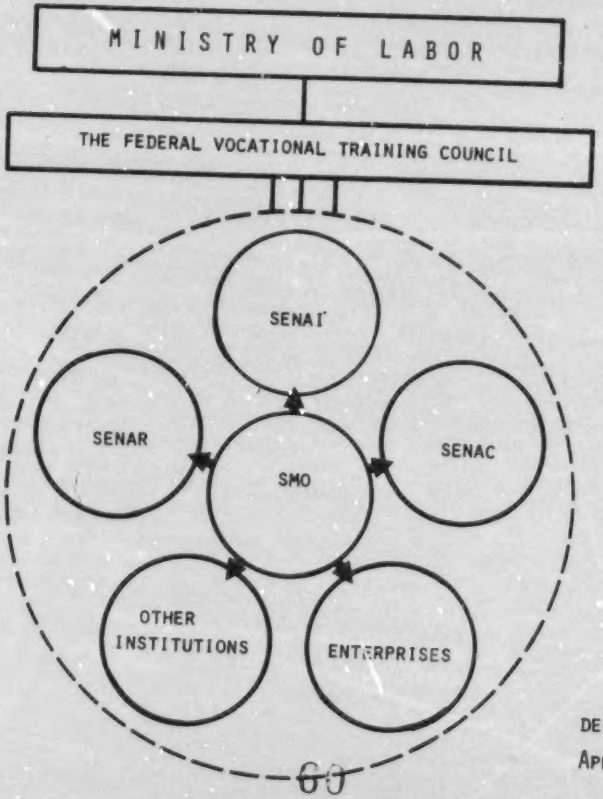
In the case of Brazil, adjustments are more difficult. There is neither a systematic flow of information nor a vocational training plan except for one pilot experiment in the south of the country. Thus, it is almost impossible to determine demand precisely although demand is the reference point for planning labor market needs for the future. For these reasons, problems in vocational training are not restricted to that area but are related to problems within the national economy as a whole.

Economic difficulties have a strong impact on all sectors. It is highly likely that high inflation rates will continue until 1985 and beyond. Because of these constraints, the economic and social development plan was not implemented.

In contrast, Japan adopted more specific and precise measures to make its economic plan more realistic and more flexible and to make it possible to adjust the plan to changing external conditions in specific time periods without threatening the main objectives or targets. Planning a decision-making system of this type necessitates much faster data availability to provide information for making desirable adjustments in the economy as external constraints demand. Mainly because of this more efficient way of making decisions, the Japanese economy is performing much better and the inflation rate is still below 10% with a real economic growth rate of 3 to 4% in 1981. Despite Brazil's current economic and social difficulties, there still is a hope for better future largely because of the high potential of the country's human and natural resources. Improved policymaking and planning should be able to contribute to the development of this potential.

CHART 1

THE NATIONAL VOCATIONAL TRAINING SYSTEM



DECREE 77.362;
APRIL 1ST, 1976

CHART 2 - RELATIONSHIP BETWEEN MINISTRY OF EDUCATION AND MINISTRY OF LABOR

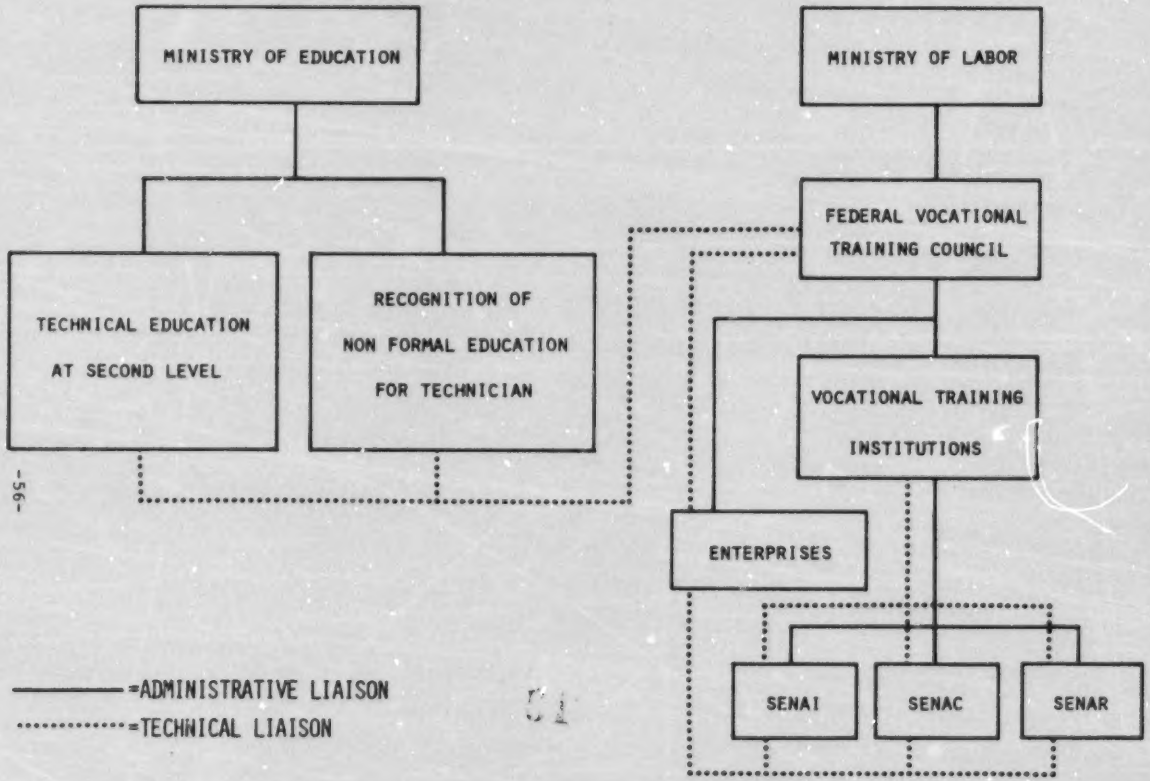
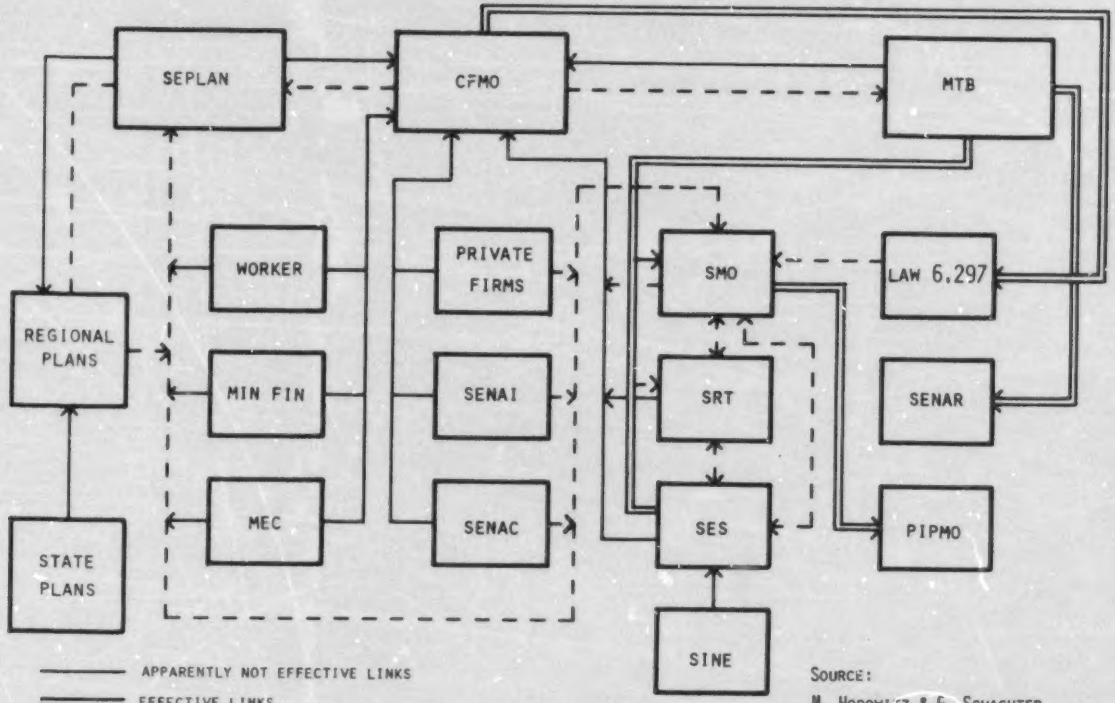


CHART 3

THE NATIONAL VOCATIONAL TRAINING SYSTEM



SOURCE:

M. HOROWITZ & G. SCHACHTER
NATIONAL SYSTEM OF MANPOWER TRAINING
BOSTON, 1980

Chart 4

ENROLLMENT PROJECTIONS

Period	Enrollment/Graduates
1979	Enrollment (estimation) - - - - 5 million graduates (estimation) - - - - 4 "
2000	Enrollment (estimation) - - - 11.6 million graudates (estimation) - - - 9.0 "
Increase 1979/2000	Enrollment change (estimation) 6.8 million graduates (estimation) 5 "
Enrollment projections for 2000	Realistic projection - - - - 11,625 million Optimistic projection - - - 11,672 " Pessimist projection - - - - 11,112 "

CHART 5

TOTAL ENROLLMENT PROJECTIONS FOR THE NATIONAL VOCATIONAL TRAINING SYSTEM TO THE YEAR 2000

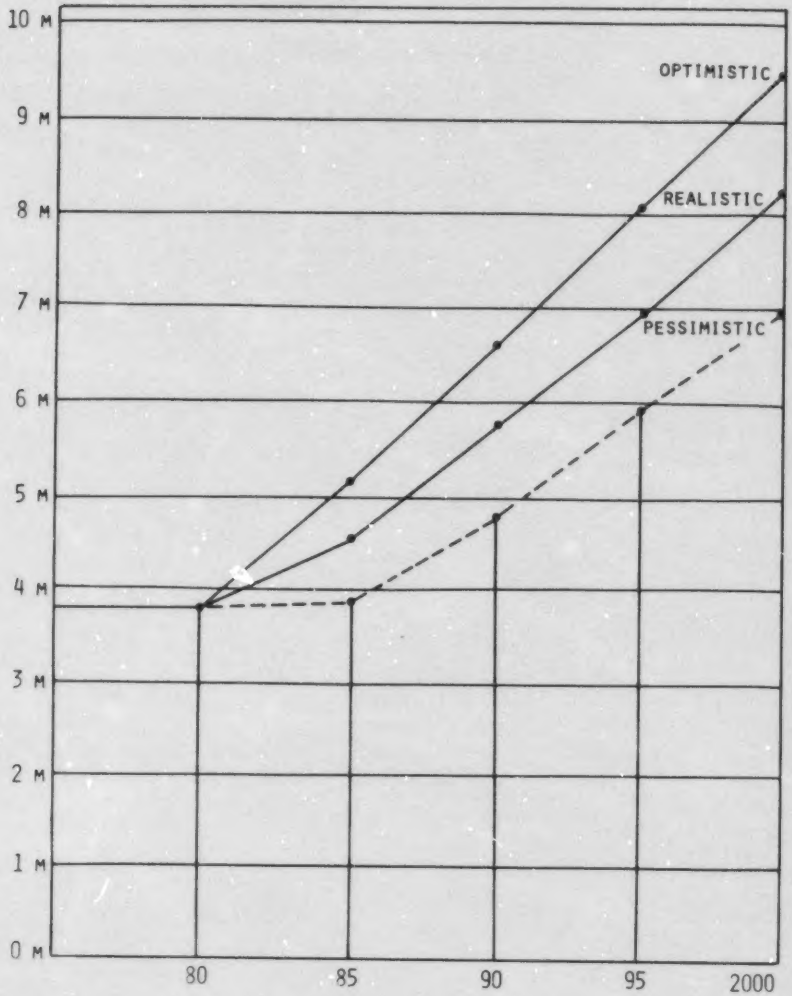


CHART 6

THE SENAI'S GLOBAL PLANNING SYSTEM - MODEL 1

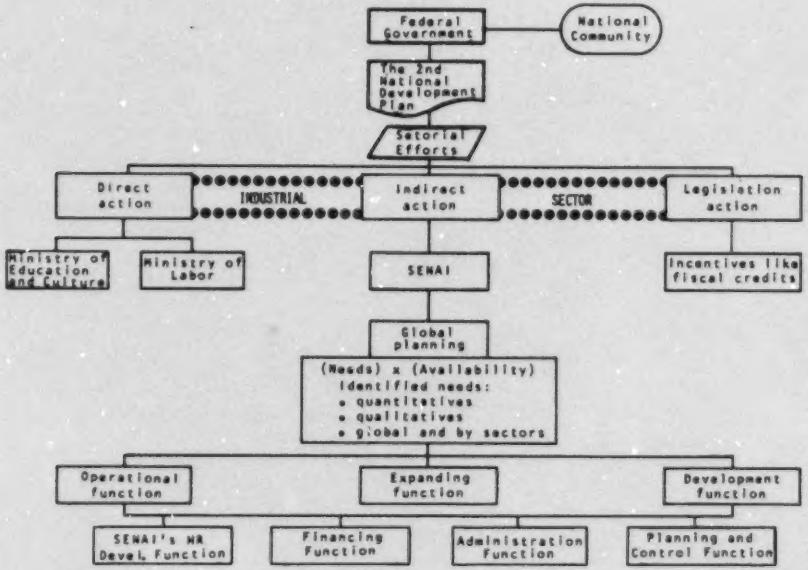


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CHART 7

THE SENAI'S PLANNING DIVISION - OPERATIONAL STRUCTURE

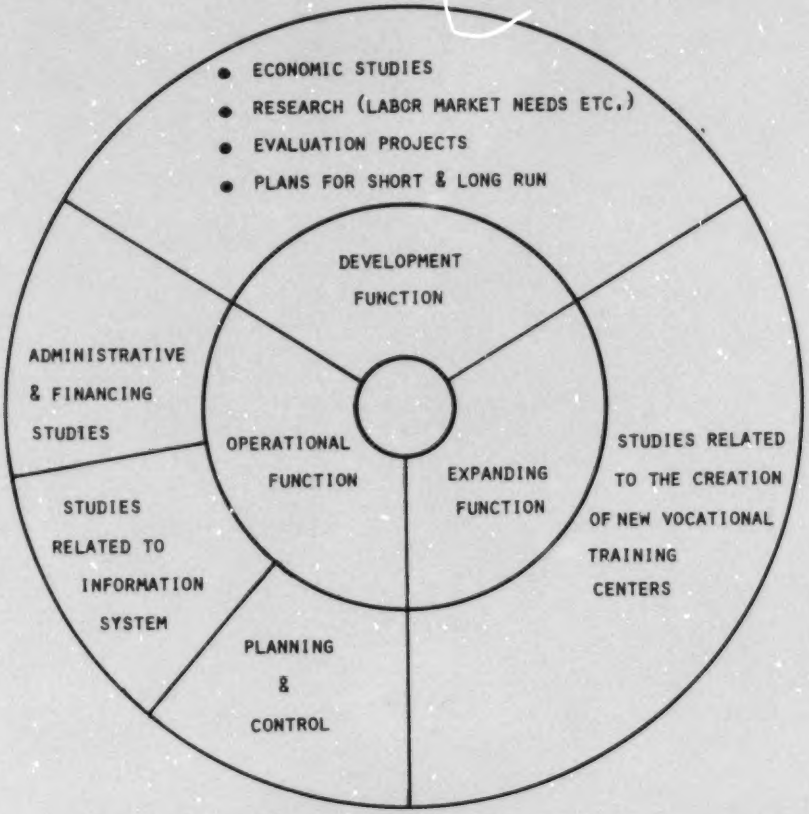

Chart 8

EVOLUTION OF THE PLANNING SYSTEM AT SENAI DURING THE LAST 20 YEARS

1967	The Decree Law 200 establishing the Federal Planning System.
1969	The 9th Regional Director's Annual Meeting in Campina Grande, establishing the main guidelines for planning vocational training at national level.
1960/70	High Industrial growth rate - in this period were built 46 Vocational Training Centers and 2 technical schools.
1969/70	The first research groups in the Regional Departments.
1972	The 12th Regional Director's Annual Meeting - discussed were objectives and ways for an integrated planning model for SENAI at national level. The Annual Budget Program was also adopted.
1973/74	Starts the world economic crisis with strong implications for the industrial growth rate as well as the employment level.
1974	In each Regional Department new research and planning units were established and also several programs were developed to train planning staff.
1975	The National Diagnosis of the SENAI systems was made.
1976/78	A new "planning policy for SENAI at regional as well as at national level" and "The first plan for three years" were defined.
1979	New government was established for the 1979/85 period.
1979/80	Mainly a transitional period.
1980/82	The second plan for three years - I PAIS. The PAIS - The National plan for integrated action was established by federal government policies only for short run and conjunctural measures.
1981	The main policies for vocational training are published (Secretary of Manpower).
1981/83	The world crises affecting the economy with strong impact on social programs. The industrial growth rate declines. As a consequence the SENAI's budget declines, brining serious problems in several states. The economic trends completely undefined.

Chart 9a

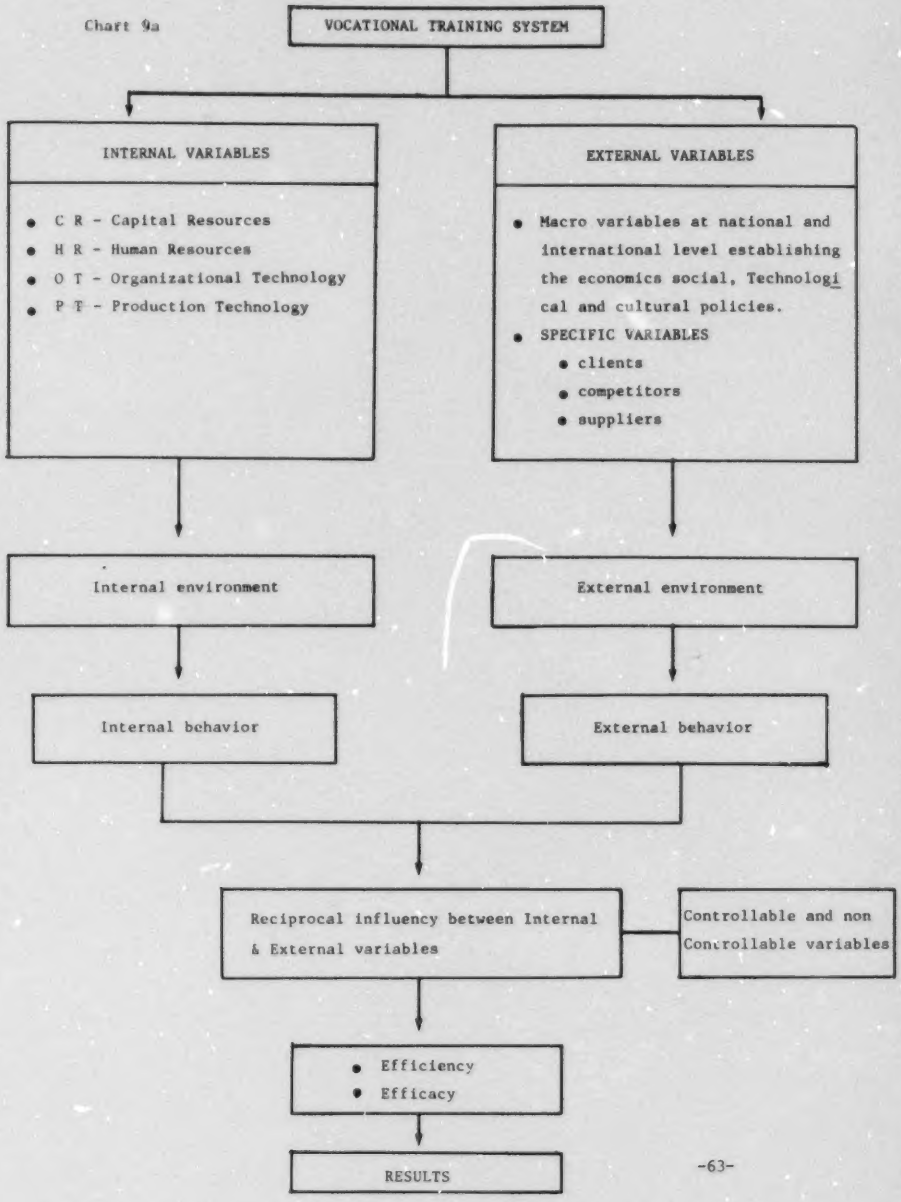
VOCATIONAL TRAINING SYSTEM
INTERNAL VARIABLES
• C R - Capital Resources
• H R - Human Resources
• O T - Organizational Technology
• P T - Production Technology
EXTERNAL VARIABLES
• Macro variables at national and international level establishing the economics social, Technological and cultural policies.
• SPECIFIC VARIABLES
• clients
• competitors
• suppliers
Internal environment
External environment
Internal behavior
External behavior
Reciprocal influency between Internal & External variables
Controllable and non Controllable variables
• Efficiency
• Efficacy
RESULTS

Chart 9b

SELECTED DATA RELATED TO SEVERAL

EVALUATION STUDIES MADE BY SENAI REGIONAL DEPARTMENT OF SAO PAULO

KEY RESULTS	PROGRAMS				
	Apprenticeship			Skill-training	Technician
	(A)	(B)	(C)		(D)
. Employed after having finished the course	90%	73%	69%	92%	81%
. Working on the occupation or related to the course made at SENAI	78	61	68	39	66
. Working as supervisors	—	14	10	22	44
Receiving more than 3 MW	52	29	43	72	91
. Level of use of information learned through the MOS (Methodical Occupational Series)	59	68	46	56	47
Social Status:					
. Son of workers	40	56	67	30	45
. Fathers with 1st grade of education or more	40	56	67	30	45
. Students with 1st grade of education:					
before the course	2	31	40	32	100
after the course	44	91	40	39	100

Notes:
A) Lather Operators graduated in 1967, 1970 & 1973
B) Mechanical Fitters graduated in 1979
C) Electricians graduated in 1980
D) Technicians from several areas (mechanics, textile, plastics, etc., graudated in the period 1968/1976)
*Estimated data

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CHAPTER 6

STRUCTURAL CHARACTERISTICS OF MANPOWER AND SENAC'S ROLE IN BRAZIL

by
Roberto Carlos Regnier Neto

Vocational training in Brazil must respond to:

- The capacity of the Brazilian economy to create more jobs and maintain existing ones; and
- The occurrence of technological change in the process of production and work that generates new manpower requirements.

Complicating Brazil's response to these objectives has been the country's recent economic crisis, which combines economic recession with high inflation. (See Graph I) On one hand, as the economy of the country shrinks, the demand for existing manpower tends to decrease. On the other hand, the development pattern adopted in Brazil tends to direct a great part of its investment toward activities that favor the use of highly sophisticated and manpower reducing technology. As a consequence, workmen are constantly compelled to adjust to changes in their professional lives or be effectively excluded from the labor market. Furthermore, although the acceptance of new technology implies an increase in the complexity of work at certain levels, most professional workers think that the effect of modernization is either to disqualify the worker from performing certain occupational tasks or to simplify the tasks to the point where the skilled worker is no longer needed.

Meanwhile the supply of manpower increases and workers who are not able to be absorbed by the formal employment market or who have been expelled from it are compelled to become part of the so called nonformal market. Recent studies indicate that approximately 40 to 45% of the Brazilian working population is now made up of informal workers, that is, those who are not legally registered (although sometimes they are hired by legally constituted companies) or those who are part of a group of low income freelancers (odd workers, peddlers, etc.), or those who participate in micro enterprises often of the family-owned variety. Usually people within these groups live in abject poverty (income up to two minimum wages -- $120 per week*) and are not protected by labor laws.

Such a situation represents a striking challenge to vocational training institutions. According to the International Labor Office, vocational education has as an objective to discover and develop the human resources for a productive, active and satisfactory life, and,

*One minimum monthly wage on May 22nd, 1984, corresponds to U.S. $63 ($1 = 1534 cruzeiros) at the present rate.

by means of diversified education, improve each person's opportunities. It also seeks to understand and influence the factors that affect individually and collectively working conditions and the social environment. To assess vocational training, then, in Brazil one must examine employment patterns and the distribution of manpower.

THE PROBLEM OF EMPLOYMENT

In 1984 the total population of Brazil is estimated to be at approximately 130 million, while the working-age population is estimated 50 million, and increasing by 3% annually. This means that the labor market must accomodate at least 1.5 million new workers each year, as well as maintain existing jobs, just to prevent the present unemployment and underemployment from increasing.

Although there is an undeniable relationship between economic growth and rising employment and between economic recession and decreasing employment, the size of the labor force does not necessarily have to reflect exactly the general state of the economy. There will be a greater or smaller number of jobs depending on whether public and private investments tend to favor labor or capital-intensive activities.

We should not assume, therefore, that renewed economic growth in Brazil will provide a solution to unemployment, or even a return to previous levels of unemployment -- although the revitalization of the economy is essential to prevent an increase in th present unemployment rate, which is already around 13% of the working population in the urban areas. According to the economist Antonio Barros de Castro, the Gross National Product (G.N.P.) needs to increase about 6% a year to accomplish this objective. That is, for the new entries into the labor market to be absorbed, it is necessary for the Brazilian economy not only to recover from its current recession but also to regain the 1975 to 1980 growth rate of 6%. If we take into account the fact that the 1983 G.N.P. decreased in real terms by 3.9%, we realize that the situation is far from encouraging. On Graph II the significance of such decrease is shown. According to Ministry of Labour estimates disclosed by Ricardo Lima, at least one among five Brazilians who want to work cannot find a minimum wage paying job. This means approximately ten million people today in Brazil who are either underemployed or openly unemployed. The underemployed are those who work less than thirty-nine hours a week and get less than a minimum wage (less than $63 per month). There are approximately 6.5 million of these, while another million people, or 6.6% of the labor force, are actively looking for jobs without being able to find them. This does not include the number of the so called "discouraged workers", -- those people who, after having looked for a job for some time and not being been able to find one, have ceased searching.

Unemployment indexes are higher in towns and in main cities (over 8%), reaching 11% in Recife. A survey done by the Brazilian Institute of Geography and Statistics (IBGE) in the cities of Sao Paulo, Rio de Janeiro, Porto Alegre, Belo Horizonte, Salvador and Recife revealed that unemployment in the period from May to September 1983 was approxi-

mately 1.2% higher than it had been from May to September 1982.

The fact must be stressed that unemployment statistics in European countries and in the United States tend to be more accurate since the mere existence of unemployment benefits allows workers in those countries to declare themselves as unemployed. In Brazil, however, official statistics tend to underestimate the dramatic problem of unemployment. Because of the lack of unemployment benefits, the Brazilian worker -- if he and his family are to survive -- must find some means to get an income, no matter how reduced or unsatisfactory.

It is not surprising then that the IGBE revealed in its Employment Monthly Survey that in 1982 there was an extraordinary increase in the number of people who declared themselves to be working as freelancers. Thus, starting in May 1984 IBGE decided to include in its monthly survey two new categories of workers. These were: a) self-employed who had not succeeded in getting any remuneration in the month previous to the survey, and b) self-employed who had only succeeded in getting an income inferior to the minimum wage. The above two categories contribute to what is called "disguised unemployment". Graph III, which shows the unemployment curve, illustrates the dimension of the problem. Note that each index is independent.

A reservation about the precision of these figures, however, is expressed by the Fundacao Getulio Vargas analyst, Jose Claudio Ferreira da Silva, who is skeptical about the forms the IBGE uses to compile unemployment indices for Brazil. It is his contention that IBGE surveys include as unemployed only people who declare they have tried to get a job during the reference week of the survey. Those who have not made any contact during the week are simply excluded from the working population.

Ferreira da Silva admits that this is a correct, or internationally accepted practice, but he claims it is inapplicable to deep and lasting recessions such as the current one in Brazil. Under these conditions, many people, discouraged by a lack of success in finding employment and by the expense entailed in looking for a job, simply stop looking. As a consequence of this effect and of the survey methodology, both the numerator (number of unemployed) and the denominator (working population) of the unemployment index are reduced; the numerator being necessarily smaller than the denominator, the unemployment index decreases. However, this does not mean that there has been an improvement regarding the employment question. On the contrary though data do not reveal any deterioration, the situation grows worse, sometimes dramatically. In order to have a more precise idea of the situation, it would be convenient if the IBGE disclosed the number of unemployed who did not look for jobs during the survey reference week and the reasons for not looking, such as, they perceived small chances of success.

Ferreira da Silva estimates that, instead of the 5.6% unemployment rate in December 1983, the six surveyed metropolitan regions actually

had an unemployment rate of 13.5%. Furthermore, Ricardo Lima stresses the fact that, according to data for July 1983 supplied by IBGE, 42% of respondents in San Paulo have been unable to find work for over three months, and nearly half of them have been facing unemployment for over six months.

The rate of unemployment does not tell the whole story. Many of those who have jobs have to face problems related to the low salaries, the loss of personal career value, and the lack of employment security, as well as a host of other problems. According to 1980 census data, at least two thirds of wage earners in Brazil receive less than $126 a month (two minimum wages). In addition, the 1980 census reveals an income distribution profile where those in the three highest income levels, that is those who get $316 per month or more -- five or more minimum wages --, receive more than half of the total income (50.9 per cent). At the same time, the 40% of workers in the lowest level, -- those who get $63 or less per month (one miminum wage) -- receive only 8.8% of the total wage income. (See attached Graph IV, Brazilian Salary Rate Pyramid.)

Furthermore, the purchasing power of the minimum wage has steadily declined. The Statistics and Social Economic Studies Inter-Union Department (DIEESE) recently published a study revealing that:

Since its creation (it was instituted in 1936, but it was only from May 1, 1940 that its fixed value became valid) the minimum wage reached its highest real value in the 1950's. From December 1943 to December 1951, it was frozen. From 1952, readjustments became more frequent, and most times it had a percentage increase above the cost of living. From 1962 onwards, the minimum wage has lost its purchasing power, being kept, in fact, under its 1940 value. To fix the first minimum wage of two hundred and twenty-thousand "reis," the Vargas government took the lowest salaries paid in the city of Sao Paulo as a base. (Folha de São Paulo)

DIEESE concluded that to satisfy basic necessities of housing, food, health, clothing and other expenses for a workman and his family, two adults and two children, the minimum wage would have to be 337,780 cruzeiros (about $220 U.S. dollars at the March 1984 exchange rate) instead of the 97,000 cruzeiros (about $63) actually earned. Since the male head of household cannot meet the minimum needs for his family from his earnings, his children and wife are compelled to seek work and this puts more pressure on the work market.

Another Brazilian manpower problem is lack of education. In 1980, the five-year-old and over population averaged 3.3 years of schooling. Among the urban population the average was 4.4 years; among the rural population, however, it was only to 1.4 years.

CHART 1

AVERAGE SCHOOLING OF THE FIVE-YEAR-OLD AND OVER POPULATION, ACCORDING TO DOMICILE, BRAZIL, 1970 and 1980.

Domicile	Average Schooling* (5 years and over	
	1970	1980
Urban	3.4	4.4
Rural	1.0	1.4
Total	2.4	3.3

*In order to estimate the average schooling, those not declaring their schooling have been excluded.

SOURCE: IBGE, Demographic Census - Brazil 1970, 1980

Recently, however, literacy has been making relative progress. The number of people who cannot read and write has been decreasing from 57.3% in 1950, to 46.3% in 1960, to 38.7% in 1970, and to 31.9% in 1980.

CHART 2

ILLITERACY INDEX OF THE FIVE-YEAR-OLD AND OVER POPULATION BY DOMICILE, BRAZIL, 1950, 1960, 1970, and 1980.

Domicile	Illiteracy Index			
	1950	1960*	1970	1980
Urban	32.1	—	21.4	22.3
Rural	72.3	—	47.2	52.6
Total	57.3	46.3	38.7	41.9

*Note The 1960 Census did not show domicile.

There is an important caveat, however, in the use of the illiteracy rate as an index of education. The criteria used by the different censuses -- the ability to read and write -- are quite vague and inaccurate. The answers are highly subjective, since they depend on the interpretation of the person who gathers the information and the understanding of the interviewer himself. For example, Helen Lewin states clearly that:

> If the criterion used were more strict and objective, in order to evaluate the minimum level of assimilated knowledge that would allow an individual to be classified as functionally able to read and write, the picture would be quite discouraging.

CHART 3

FIVE-YEAR-OLD AND OVER POPULATION FUNCTIONALLY ABLE TO READ AND WRITE. BRAZIL, 1950, 1970, and 1980.

	POPULATION OF FIVE YEARS OF AGE AND MORE		
	1950	1970	1980
Population able to read and write, in general	40.6	60.3	64.9
Population functionally able to read and write (3 complete years of schooling)	16.7	47.2	40.5

SOURCE: IBGE, Demographic Censuses - Brazil, 1950, 1970, and 1980 In: Lewin Pitagui and C.M Romany - Manpower in Brazil - 1975.

The above data show that the number of the five-year-old and over population who can be considered as functionally able to read and write is substantially smaller than the number officially registered as being able to read and write. Thus, we face a very discouraging educational picture.

MANPOWER DISTRIBUTION

The sectoral composition of the working population in Brazil has been undergoing significant modifications as registered in every census. In 1940, Brazil was largely an agrarian economy: seven out of ten working people were engaged in rural activities; two worked in commercial activities and services; only one in ten worked in industry.

During the 1940's, the 1950's, and the 1960's this distribution changed. By the 1970 census, the rural hegemony was already on the decline: at that point five out of ten workers were in the primary sector, while three were working in commercial activities and services, and two in industry. The process of rapid urbanization of the Brazilian society during the last decades intensified in the 1970's, causing a great expansion in commerce and services in the tertiary sector. By

1980 approximately five out of ten workers were engaged in commercial activities and services, three in rural activities, and two in industrial activities (Chart 4). Indeed, Brazilian development has occurred in such a way that most of the manpower released by the primary sector has been absorbed into commerce and services. Thus, rural area manpower finds in this sector its most important route to its assimilation in the urban labor market.

CHART 4

DISTRIBUTION OF THE WORKING POPULATION BY ECONOMIC SECTOR
Brazil: 1940, 1950, 1960, 1970 and 1980

Economic Sectors	1940	1950	1960	1970	1980
Primary	65.9	59.9	54.0	44.3	29.9
Secondary	10.4	14.2	12.9	17.9	24.4
Commerce	4.7	5.5	6.5	7.6	9.4
Services	16.3	17.4	23.5	26.3	32.2
Public Administration	2.7	3.0	3.1	3.9	4.1
Total Working Pop.	100	100	100	100	100
(n .)	14.558.598	17.117.362	22.750.028	29.557.224	47.796.763

Source: IBGE - Demographic Census, Brazil, 1940/1950/1960/1970/1980

By 1980, the largest fraction of wage earners were employed in commerce and service enterprises. In 1984, almost half (47%) of the employees in Brazil were engaged in commercial activities and services: 9.5 percent and 37.6 per cent, respectively. Since 1940, the primary sector's share of total employment has declined continuously, falling from 66% to 30% of the working population by 1980. (See Graph V)

Between 1970 and 1980, wage earners increased their share of the working population from 54.8% to 56.7%. There is also an increase in the number of employers from 1.4% in 1970 to 2.4% in 1980. On the other hand, there was a decrease in the number of self-employed in the working population from 30% to 21% in 1980.

In 1970, about 50% of the rural workers were self-employed and about 38% of the commerce workers were also freelancers. In 1980, the number of rural freelancers fell drastically to 38.5%. Among the commerce workers, the reduction in the number of those considered as freelancers was also quite marked, falling from 38% to 29%.

The acceleration of trends toward the concentration of land ownership, the expulsion of a great number of squatters from agriculture, the cattle raising expansion, and the development of capitalist forms of farm production had the dual effect of increasing the number of rural wage- earners and immigrants looking for jobs in the big cities and reducing the number of rural self-employed.

The relative decrease in the number of freelancers in the commerce sector between 1970 and 1980 is possibly related to the expansion of large foodline enterprises (supermarkets), which resulted in the closing down of many small food enterprises (the district grocer's, greengrocer's, etc.).

However, if one compares these data with those previously analysed, one can see that 1980 represents the beginning of a period of economic recession may have fundamentally altered the described distribution of the labor force. The number of people engaged in non-capitalistic forms of production will likely increase. These production forms are increasingly becoming important survival alternatives for a large part of the population. In this category, are to be found peddlers, small handicraftsmen, and "street sellers" of all types, who constitute part of the so called "non-formal labor market".

Finally, it is important to note that some of the tertiary jobs (administration and bureaucratic office functions) are also present in the activities of the other economic sectors, which gives us the real dimensions of the SENAC field of activity.

SENAC'S MISSION

Originally SENAC was dedicated to providing apprenticeship opportunities to the young and training opportunities to adults. Nowadays, it is an open system for preparing personnel for the tertiary sector. SENAC adopts five operational models: Vocational training Polyvalent Centers; Pedagogic Enterprises, where the educational process and the rendering of services are practiced on the job; Tele-education, meaning education from a distance; Mobile Units, made up of teams that work outside the towns; and on the job training.

Vocational Training Centers

Within SENAC's 170 Vocational Training Centers and Mini-Centers, which are distributed all over the country, the following types of courses are offered:

. Apprenticeship Courses: Training courses aimed at underage apprentices, who, by law, have to be enrolled in SENAC.

- Basic Courses: training courses that prepare applicants to perform basic and less complex job tasks.

- Qualification Courses: courses aimed at the preparation of applicants for a job that requires the trainee perform all the tasks that characterize such a job.

- Aptitude Courses: regular and second degree courses aimed at basic training and training of technicians and assistant technicians, according to the law.

- Specialized Activities: seminars, courses, meetings, lectures, conferences, round-tables, symposia, sessions. The programs are designed for applicants who are already qualified for work in an occupation or for working professionals. These activities are aimed at improving performance levels and/or updating specific skills.

- Training program: training in specialized services. SENAC has 3 school-hotels, 15 school-restaurants, 42 school- beauty-parlors, 6 school-cafeterias, 1 school-supermarket, 1 school-travel agency and 1 school-service-station.

Tele-education

Teaching from a distance, as teleducation is called at SENAC, is education disseminated through radio, correspondence, and television. It allows students to receive their education at times convenient to the individual who does not have to move either from work or from home. It takes vocational training to regions where conventional teaching techniques have traditionally lacked access.

Mobile Units

Mobile Units constitute an operative model through which SENAC Regional Departments can develop their programs outside the Vocational Training Centers. The units provide intensive courses and are staffed by special instructors who teach, recruit students, look after the audio-visual equipment, and perform administrative functions.

On-the-Job-Training

Vocational Training is also offered on the job. The manager or the owner of the enterprise supplies some feed-back to the instructor, who, in turn, assists the enterprise, advising on ways that it can internally improve its human resources.

Initially SENAC's programs were limited to commerce. Today they cover every aspect of the tertiary sector. Currently it provides more than a hundred types of Vocational Training programs, covering fourteen different areas pertinent to commerce and services. They are as follows:

- Business Administration: courses and seminars supplied to managers and owners of commercial enterprises, covering General Administration, Financial Administration, Personnel Administration and Materials Administration. There are also courses and seminars on Fiscal and Labor Legislation.

- Office - the first area to be covered by SENAC and the one with the greatest number of users. Program includes Communication, Documentation, and Secretarial Skills.

- Purchase - a recent training area in SENAC. There are courses for Purchaser and Auction Bidder in the purchase function.

- Sales - the most common courses in this area are: Sales Techniques and Psychology; Sale Assistant; Territory Salesman; Front Salesman; Sales Promoter; Door-to-Door Salesman.

- Advertising - includes all the arts applied to commerce. The applicant must have an artistic bent and great interest in putting into practice everything he has learned. Included in the list of courses for the advertising area are: Window Dresser, Poster Maker, Indoor Decorator, Lay Out Man, Lettering Expert, Advertising Designer, Professional Model, etc.

- Storage, Packing and Goods Dispatching - courses include: Packer, Ornamental Packer and Stockman.

- Vegetable Goods Checking and Classification - the growth of agricultural distribution and production led SENAC to supply courses in this area, such as: Coffee Sampler, Vegetable Products, Sampler and Coffee Taster among others.

- Hospitality (Hotel & Tourism) - there has been a great demand for professions in this occupational area. Thus, SENAC supplies courses to train cooks, waiters, receptionists, stewards, confectioners, parlor servants, restaurant administrators, and barmen.

- Tourism - courses prepare students to become tourist guides, tourist receptionists, travel agents, etc.

- Health - in an attempt to provide top quality professionals in the health area, the SENAC offers the following courses: Assistant Nurse, Attendant, Surgical Instrument Handler, Hospital Statistician, Hospital Kitchen-pantry Service, Masseur, Prosthodontist, and others.

- Hygiene and Beauty - this is an area where there is great social demand and applicants can begin work immediately. Some start their own business, others freelance, still others work in a beauty parlor. The SENAC programs consist of: Hairdresser, Manicurist, Make-up Expert, Facial Aesthetician, etc.

CHAPT 5

TOTAL ENROLLMENT BY OCCUPATIONAL AREAS FROM 1981 TO 1983

Areas	Total Enrollment				
	1981	1982	1983	Total	Percent
Goods Checking and Classification	387	141	96	624	0.02
Administration and Management	78.384	72.808	60.996	212.188	7.6
Storage, Packing and Dispatching	8.972	11.179	12.753	32.904	1.2
Office	384.595	423.858	404.526	1,212.979	43.4
Purchase	1.031	1.196	343.000	2.570	0.9
Sale	61.322	62.034	55.571	178.927	6.4
Communication	84.279	76.188	81.655	242.122	8.7
Advertising	17.446	23.579	26.453	67.478	2.4
Hygiene and Beauty	61.698	64.885	75.159	201.742	7.2
Hospitalization	27.753	33.277	38.572	99.602	3.6
Maintenance	16.091	18.493	15.922	50.506	1.8
Health	75.922	82.299	76.924	235.145	8.4
Tourism	14.918	12.415	8.541	35.874	1.3
Informatics	—	2.081	4.409	6.490	0.2
Others	67.853	63.097	85.055	216.005	7.7
Total	900.651	947.530	946.975	2,795.156	100.0

. Maintenance - the growth of urban centers led to the enlargment of SENAC programs training students to hold positions as: doorman, caretaker, liftman, manservant, petrol station attendant, etc.

. Information - this is a new area for the SENAC and reflects employment developments in the large centers of computer technology. A center for training in this area has recently been established. It is equipped with twenty micro-computers. Other centers in several states of Brazil are being planned.

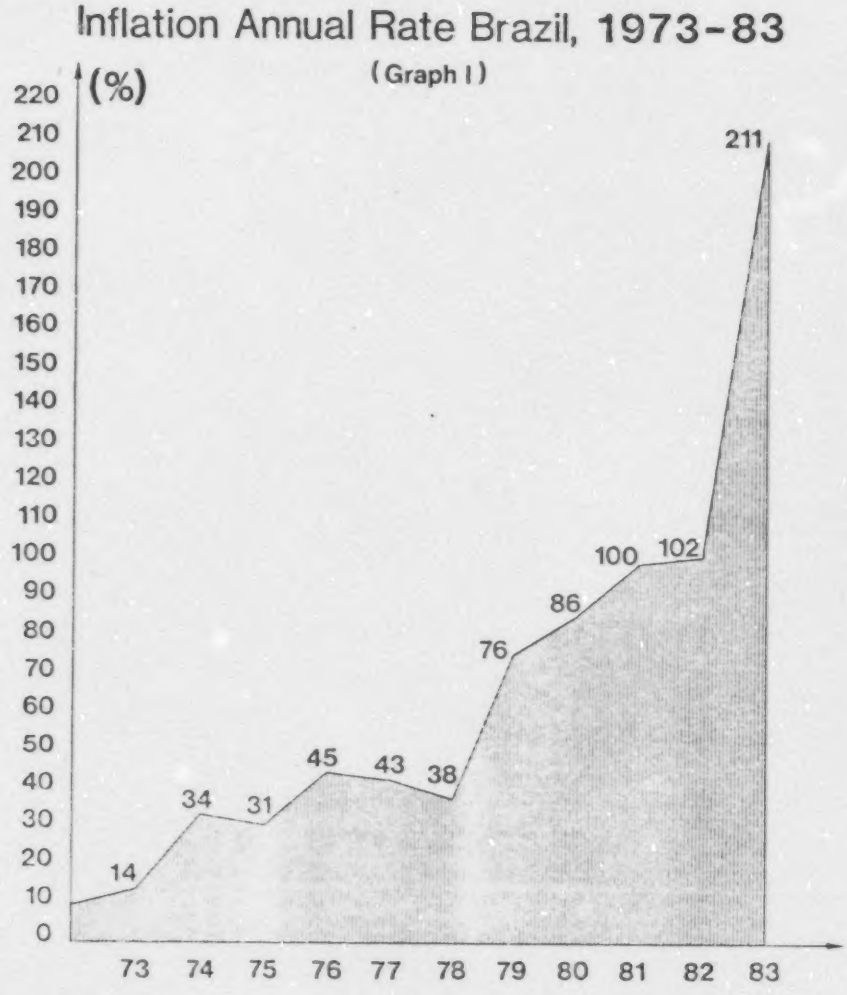
SENAC began as a small operation in 1946. Enrollment for the first ten years was 212,170. That doubled in the next decade and in 1984 reached 908,602 for that year alone. The rapid expansion in enrollment was due to the increased demand for qualified personnel by the tertiary sector as well as by the enlarged network of Professional Vocational Centers and Pedagogicical Enterprises. A further stimulus was given by the closer interface with enterprises that received technical assistance through on-the-job training.

Most of SENAC's programs are covered by its own resources. Between 1981 and 1983, only 6.6% of training was executed with other than SENAC's funds. Half of the training is carried out in vocational training centers and about 25% in mobile units. Teleducation is responsible for about 15%, and on-the-job training covers 9% of all enrolled. According to enrollments, one fifth of all courses are for beginners, two fifths are for entry qualifications and about two fifths of the courses are directed toward skill updating.

While the trade sectors enrolled twice as many students as the service sector, Chart 5 shows that, in general, training in the tertiary sector is for office workers. Geographically, as one would expect, the greatest enrollment is in the Southeast where most industry is located. Only 3.3% of all enrollment occurs in the North.

By 1983, SENAC served 1,509 counties - more than one-third of all counties in Brazil - and employed 6,950 teachers, instructors and experts in 117 school units. Annual enrollment approached one million students for courses varying in length and content. In 1963, 2.6 million lesson hours were administered, of which only 0.6% were not regular courses (session, meetings and lectures). About one fourth of all those enrolled are underage students who are attempting to enter the labor market well prepared. The success of the program can be measured by the low dropout rate, (10.3%), and the graduation rate of 87.9%. This performance is accomplished at a small total annual cost -- about $29 million in U.S. dollars in 1983 (at the official exchange rate of December 1983) or about U.S. $10 per student hour taught.

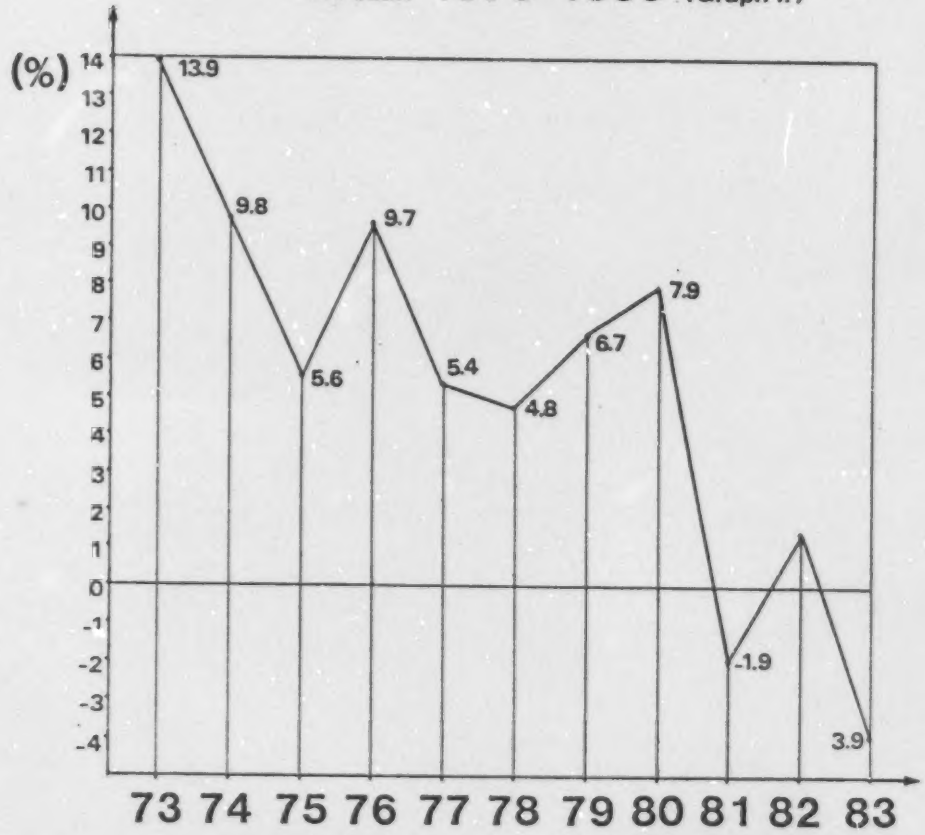
GRAPH I



Source: Weekly Index n 299, Rio de Janeiro, 1984.

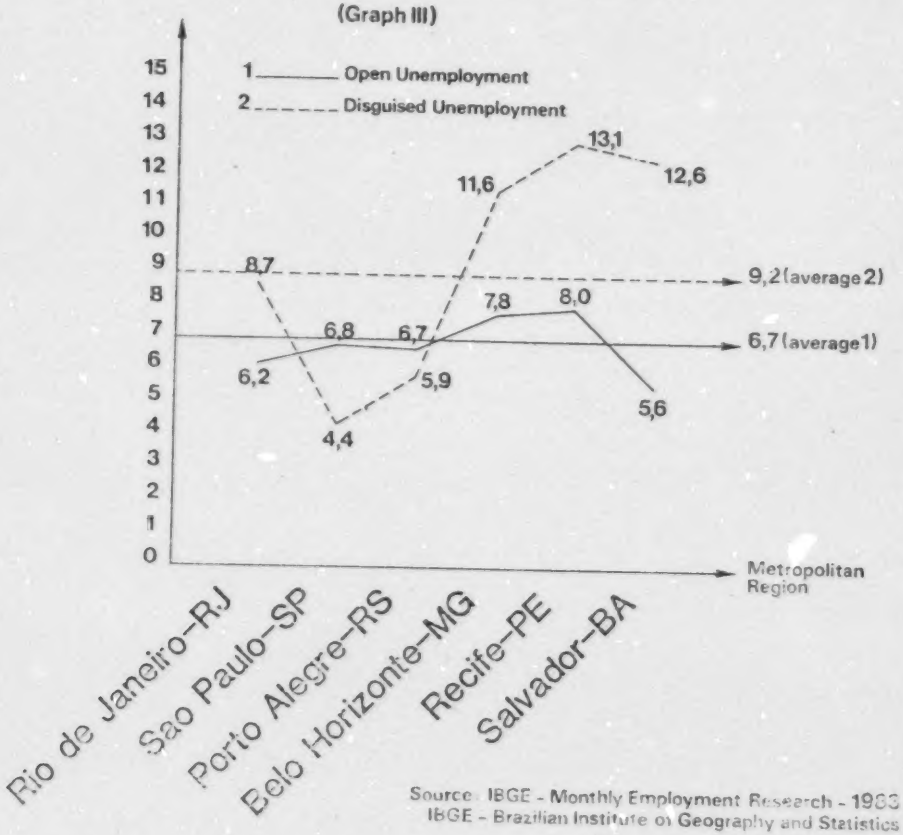
GNP (Gross National Product) Anual Rate

Brazil 1973-1983 (Graph II)



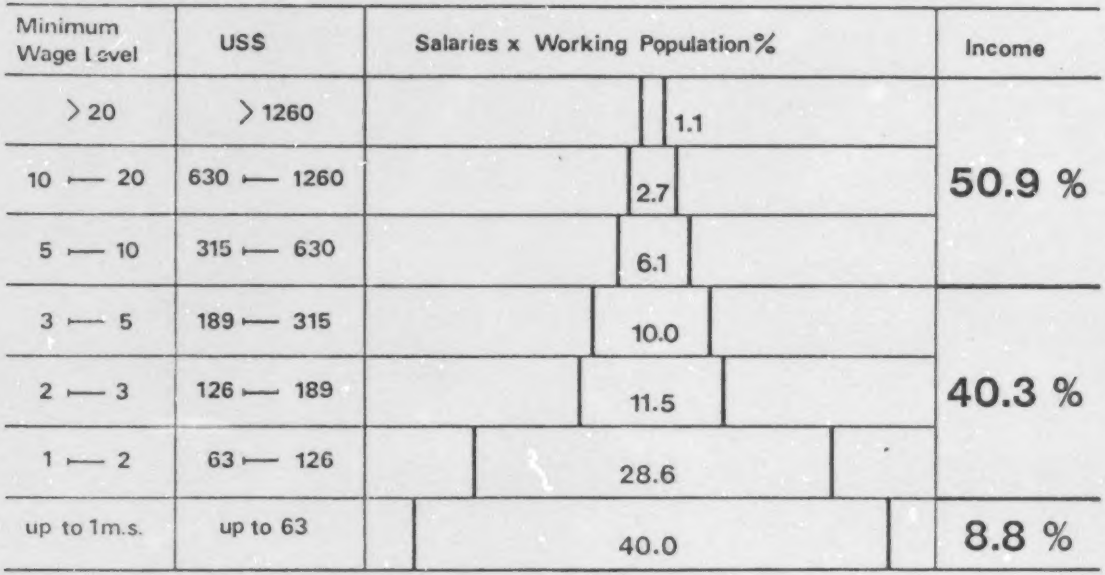
Unemployment Rates by Metropolitan Regions Persons aged 15 and over–1983

(Graph III)



Source: IBGE - Monthly Employment Research - 1983
IBGE - Brazilian Institute of Geography and Statistics

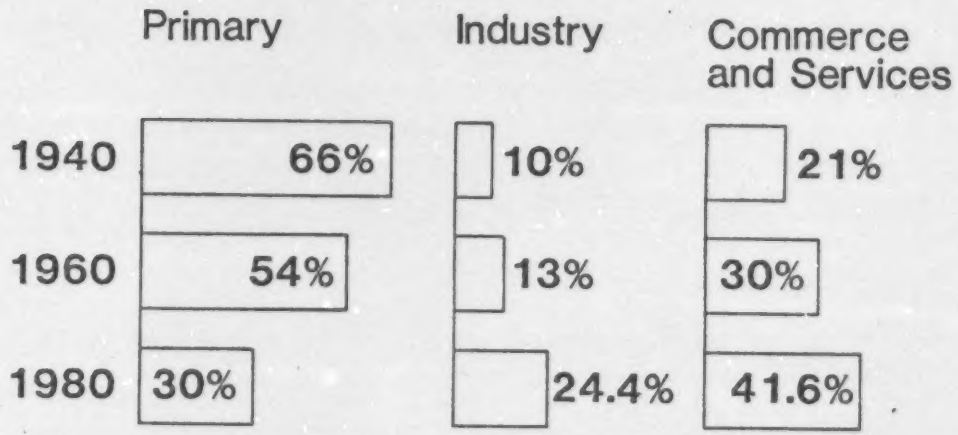
Salary Rate Pyramid
and Salary Income Distribution
Brazil, 1980 (Graph IV)



Source: IBGE - Demografic Census - Manpower. Brazil, 1980

Distribution of the working population *
by Economic Sectors
Brazil, 1940, 1960 and 1980

(Graph V)



Source IBGE - Demographic Census, Brazil, 1940/60/80.

* Working Population = person aged 10 or more who have paid activities, are unemployed, or are looking for work for the first time.

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CHAPTER 7

SOME STATISTICAL INTERPRETATION OF VOCATIONAL EDUCATION IN BRAZIL

by
Paul Ammann and Gustav Schachter

To be efficient vocational education must be continuously evaluated and adjusted to the changing needs of the society. This is true especially in countries with extremely scarce resources or where a recession prevails. The choice between investment in the production and physical infrastructure sectors, on one hand, and the social sector like education and health, on the other, becomes very difficult. Frequently policy makers favor physical and productive industrial objectives, postponing social goals to periods of relative abundance.

Projects which need public financial resources usually must be presented in a manner that shows favorable benefit-cost ratios. Benefit-cost analysis, however, needs quantitative, monetary information about benefits and costs. These data are easier to obtain and calculate for industrial and physical projects than for social and cultural targets. Nevertheless economists have succeeded in estimating benefit-cost ratios of education. (Sommers and Woods)

In Brazil this type of analysis was recently attempted for vocational education. This has been possible because, since 1979, a rich body of data was made available by the Ministry of Labor. Vocational education institutions have undertaken process evaluation, and ethnographic and comprehensive evaluation, as well as outcome evaluation. Indeed, better statistical data and interpretation can contribute positively to the decision-maker's choice.

In the present paper we describe the sources of some of these data, defines evaluation concepts, and shows the overall dimension of the principal variables. Then we interpret the data referring to the formal labor market in the manufacturing sector. Finally, we present a proposal to expand the analysis to the nonformal and total labor market.

INFORMATION BASE: VOCATIONAL EDUCATION, LABOR FORCE, AND PRODUCTION

Vocational Education

There is one centralized source of data for vocational education called the Sub-System of Statistical Information on Vocational Education (SSINFMO). This information system is a part of the National System of Vocational Education (NSVE), and includes most of the vocational education institutes. (Ministry of Labor) The most important of these are two private institutes, the National Service for Industrial Apprenticeship (SENAI) and the National Service for Commercial Apprenticeship (SENAC), and a government agency, the National Service for Rural Vocational Education (SENAR). Other participants are the enterprises that

are registered with the Ministry of Labor in order to use the tax benefits of the Vocational Education Incentives Act. (Ammann)

The National System of Vocational Education is coordinated by the Secretariat of Manpower of the Ministry of Labor under the supervision of the National Council of Vocational Education, which has as permanent councilors the directors of SENAI, SENAC and SENAR, and as president the Secretary of Manpower. Each year the vocational education institutes send their data to the Ministry of Labor (Secretariat of Manpower), which processes and publishes them in the Secretariat's Monthly Information Review.

Labor Market

Total Labor Market: The Statistical Institute of the Ministry of Planning (Planning Secretariat) releases the Economic and Population Census every ten years, the Population and Labor Survey every year (except on the census years), and an unemployment survey every month. (Planning Secretariat)

The variables of the population census are similar to those in the U.S. census and the variables of the annual survey are similar to those in the U.S. monthly household data compiled in the Current Population Survey, (CPS). Besides the labor variables included in each annual survey, the questionnaire focuses on an additional set of questions every year: one year education, another health, then housing, nutrition, etc. The survey's sample is designed to allow analysis by major states and groups of small states.

The unemployment survey is a household survey covering the six largest metropolitan areas, which total about 12 million workers or one quarter of the total employed labor force. The sample is designed to enable analysis by the four major economic sectors, earnings in two groups (less than the minimum wage and more than the minimum wage), new entrants and job losers, employees and self-employed, and finally, weeks unemployed.

Formal Labor Market: The Annual Survey for Social Information (RAIS or Establishment Survey) covers labor statistics of all registered firms. This is known as the formal labor market. Five ministries are directly interested in the data and are paying for the survey, which is coordinated by the Statistical Institute of Planning Secretariat and processed by the Ministry of Labor, which also publishes the data.

The survey covers about 18 million workers employed in about one million firms. It tabulates occupation (345 3-digit occupational families out of 2096 5-digit occupational titles), 36 economic sectors grouped out of about 500 4-digit sub-sectors, earnings (in absolute numbers), education (9 levels), civil state, age, sex, time employed, geographic origin, health insurance paid, Time-on-Job Guarantee Fund paid, admissions, lay-offs, causes of lay-offs, turn-over, size of firm, and total payroll of the firm. The data are processed territorially by the 4000 municipalities, metropolitan regions, micro-regions, meso-regions, states, and macro-regions. The data base is organized in a manner that allows any type of cross-tabulations, including rankings by

occupation (most frequent occupation) and by municipality.

Nonformal Labor Market: The source of information for the nonformal labor market is the same as that for the total market described in the Total Labor Market section above, that is, the population census and the annual population household surveys. The nonformal labor market includes everyone in the labor force not accounted for in the formal labor market.

Production

The production (physical and value) data are collected by the Statistical Institute every five years for the economic census which covers most sectors. The industrial (manufacturing) census measures the production of about 4000 products. In a monthly sample survey, the Institute collects data on the value of production. These data and all other economic data are analyzed by the Fundacao Getulio Vargas, a semiprivate foundation specializing in economic research and teaching, which also calculates the monthly and annual inflation rate, GNP, and other macro-economic indicators. These indicators are published monthly in the economic review, Conjuntura. For the industrial production, the Foundation uses indexes of real values. The index base for the time series 1975-1982 is 1975 = 100.

The monthly collected data are based on samples that are representative of production, but not necessarily representative for labor employed. That is why there are significant differences between the labor data collected by the survey, which is collected by the same Institute but analyzed by the Fundacao Getulio Vargas, as explained below.

DEFINITIONS

The Concept of Vocational Education

The concept of vocational education was developed in the beginning of Brazil's industrialization, especially during World War II when the country had to substitute its own production for most imports. This required skilled labor. During the 1940's the Laws (Acts) for Industrial, Commercial and Agricultural Education were formulated and SENAI and SENAC were founded.

The Industrial Education Act defines Vocational Education as an activity aimed at:

1. the interests of the worker, who will acquire the preparation for his job and his human accomplishment;

2. the interests of the enterprises, which will obtain a sufficient number of well prepared workers, according to their growing and changing requirements;

3. the interests of the nation, promoting continuously the mobilization of efficient man-

power for its economy and culture. (Lei organica do ensino industrial)

The principal variables of the vocational education information are defined as follows:

Type of Course: There are three principal types of courses, each with its own goal. The first aims to qualify the student to perform competently in an occupation that needs skills ("skilled occupation"), the second aims to provide only an introduction or initiation to an occupation, and the third aims to upgrade or retrain. The duration of a course varies according to the type of course.

Enrollments: Students who register and attend at least the first lesson of the course are included in enrollment data.

Graduates: Students who conclude the course, fulfilling its specific requirements, are counted as graduates. The number of graduates as such is not an adequate indicator to measure the flow of qualified people supplied to the labor market, since there are (few) graduates of courses of long duration and (many) of courses of very short duration.

Duration: Duration is defined by the number of hours (lessons) per course. The duration varies from one hour of training to 3600 hours of technical education, depending upon the type of course and the occupation for which one prepares. To avoid double counting for courses that require more than a year, only the base year is counted.

Drop-outs: Drop-outs include those who did not conclude the course at the end of the base year. It does not include those who continue the course in the subsequent year.

Student-hours (man-hours): The number of lessons (hours) attended by each student enrolled in the course are counted as student-hours. This is the most appropriate quantitative variable.

Capacity of Vocational Education: Human, technical, pedagogical, administrative, and institutional physical and financial resources available to produce a certain annual output of man-hours are considered as the capacity of vocational education.

Personnel: Personnel includes all human resources necessary to run the courses, including teachers, and technical, administrative, and directive personnel.

Centers/Schools: Units include buildings, physical installations, workshops, and labs in which the vocational education is administered. The centers can be fixed or mobile or can be studios, as in the case of education by correspondence and by TV/radio.

Costs: Costs include annual total expenditure to maintain and expand the capacity. The costs are divided into current (maintenance) and capital costs.

Levels: Finally, as far as the levels of education are concerned, the National System of Vocational Education does not cover the courses of higher education that prepare for a profession. University education is coordinated by the Ministry of Education. However, professionals may participate in short courses, such as language courses, management seminars, etc., offered by the NSVE.

Labor Market

The total labor market consists of the formal and nonformal markets, reflected by a dual economy.

Formal Labor Market: The formal labor market is defined by the Secretariat of Manpower of the Ministry of Labor as the market consisting of the firms and employees registered ("formally") at different agencies such as Ministry of Labor, Ministry of Finance, Statistical Institute, Social Security, and that participate in the Annual Survey of Social Information (RAIS). The formal market covers all the modern, organized, and structured firms whose employees compose a primary privileged market, having at least a minimum wage, social insurance, time-on-the-job guarantee fund (FGTS), paid vacation, and other benefits guaranteed by the labor laws as well as fringe benefits offered by the larger firms.

In the total market, this modern sector can be considered an internal market according to Reynold and Doeringer and Piore, or a privileged sector according to Kannappan, that is, a primary market with comparatively stable jobs, well paid, better education, more vocational training, better working conditions and access to various fringe benefits.

Nonformal Labor Market: The nonformal labor market consists of those who are not registered in the above agencies or working in firms that are not registered and do not participate in the Establishment Survey (Annual Survey of Social Information - RAIS). This market is very similar to the secondary market described by Doeringer/Piore. It has lower earnings (half of the workers in this market earn less than a minimum wage), lower education, and usually has no health insurance and other benefits guaranteed by the labor laws.

Only in a very exceptional case might a skilled worker be better off in the nonformal market. Such a case occurs when a worker decides not to be an employee but self-employed, with earnings higher than minimum wage.

It should be stressed that this concept of nonformal market is not identical to the concept of underground economy, sometimes used to describe the segment which aims at tax evasion. Most firms and workers of the nonformal market earn below a certain limit, which classifies them in the zero tax bracket.

Labor Force: The population census defines the labor force as follows:

All the persons of ten years of age or more, who, dur-

ing all the 12 months before the census or during some time of the 12 months, worked for pay in money wage or non-money wage, including those who received wages but actually did not work because of illness, study leave, etc., and the persons who usually worked 15 or more hours per week, even without payment for work performed for helping the person with whom they reside or working as apprentices. Included in the labor force are the persons of ten years of age or more, who did not work but looked for work during the two months preceding the census date. (IBGE)

Unemployment: There is no explicit official definition of unemployment in the census and the annual survey publications, but it is evident that the number of unemployed is the difference between the number of the total labor force and the number of those who worked, as defined above. In the monthly unemployment survey, the visibly unemployed are those of the labor force who actively look for work in the reference week of the survey without succeeding in getting work. In a monthly survey, the lower limit of the age of the labor force is fifteen years.

Underemployment: Underemployment has many definitions, well discussed by Gunnar Myrdal, Lyn Squire, and Subbuah Kannappan, among others. The Fundacao Getulio Vargas considers as subemployed or underemployed those workers who are self-employed and earn less than a minimum wage.

Since it is difficult to clearly distinguish in the interviews self-employed and employed in a nonformal market (family firms, family farms, cottage industries), we define as underemployed all those workers who earn less than the minimum wage. Overt unemployment is traditionally very low in Brazil, only 5.6% in December 1983, in the midst of a recession which was worse than the depression of the 1930's. However, underemployment is historically widespread, affecting about half of the working labor force.

New Entrants: Finally, it is indispensable for vocational education planning to know how many people join the labor force for the first time each year, seeking a job. One of the main tasks of vocational education is to prepare these new entrants for their occupation or job.

The growth rate of new entrants to the labor force is not constant in developing nations and, therefore, must be calculated every year. In fact, this rate is highly sensitive to income changes. When income is higher, the tendency is for young family members to continue their studies for a longer period, postponing the entrance into the labor force. When income decreases sharply, as it did in the 1981-83 recession, then the families need additional workers to compensate for lower incomes and the growth rate of new entrants increases. In the year 1981-82, this rate doubled, which meant that 3 million young people

entered the labor force instead of 1.5 million in pre-recession years ("normal" years).[1]

Production

The value of production is defined by the Statistical Institute at factor costs. About 4000 products are produced in the manufacturing industry, which is divided into 22 sectors. Products can be final or intermediate, sold or in inventory. In the value of the product can be included the value of its installation.

Whereas the production concept is the same in the monthly industrial production surveys and in the quinquennial industrial census, the methodology is different, with the latter using the universe and the former a sample of large enterprises. In recession these enterprises react immediately to lower demand by dismissing large numbers of workers, and in recovery they react quite cautiously by not recalling laid-off workers but by requiring overtime from their remaining employees. The employment level represented by this sample, therefore, is lower than the average of the universe, since its measure is not per workhour, but per worker. On the other hand, productivity of labor seems higher in the sample (1980 extrapolated to 1982) since the sampled firms employ fewer workers (but more hours worked), while in the universe the smaller firms dismissed fewer workers or even absorbed some of those dismissed from the larger firms, while production declined. The importance of these facts is clear when we analyze production, employment and vocational education.

DIMENSIONS

Vocational Education

The National System of Vocational Education (NSVE) presently covers about twenty institutes which run (directly) or organize (indirectly) vocational education. As mentioned above, the largest enrollment originates with SENAI and SENAC and the group of enterprises covered by the Training Incentives Act of 1976. These institutes have or work with about 700 Training Centers or Vocational Schools, some of which are quite simple, delivering courses of short duration. Others are highly sophisticated and fully equipped to educate skilled workers in courses of up to 3600 hours. About 30,000 employees are engaged in the planning, executing, and administrating of vocational education, most of them instructors.

The courses cover practically all sectors and major occupational groups, although not necessarily in proportion to the occupational structure, especially not in the secondary, nonformal market. There is limited information on nonformal markets. For the nonformal sector in general, and for the agricultural sector in particular, quantitative

[1] The normal yearly increase is defined as the population of 15 years of age (after the compulsory primary school age) multiplied by the overall labor force participation rate; for 1982 these were respectively, 2.7 million and 55%. (IBGE - Annual Household Survey, 1982).

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information is less available or accurate than for the modern market.

Since the duration of courses varies considerably, the variables "enrollment" and even "graduate" do not measure the real performance or capacity of the NSVE. The best measure is student-hours per course, because this takes into consideration occupation (course has the same classification as occupation), duration, graduates, and drop-outs.

If we want to use the variable graduate, we must classify it in at least two groups: those who graduated from courses which really qualify the students to perform competently in an occupation that requires skills and those who just receive an initiation, an upgrading or retraining, and those who attend a seminar or a conference in the framework of life long or continuing education.

The dimension of vocational education is shown, using these two categories. In Table A, since the main difference between them is the duration, we simply identify them by the terms "longer duration" and "shorter duration" - A.1 and A.2. The same capacity then is classified according to the position of the clientele, who can be new entrants to the labor force (youths - A.3) or already in the labor force (adult workers - A.4).

The Dimension of the Labor Market

As defined above, there are two substantially different labor markets in Brazil: a formal and a nonformal one, which are similar to "primary" and "secondary" markets. As has also been made clear, the labor force is classified into three types of employment status: the employed, the underemployed and the overt unemployed. Finally the labor force is divided into two types of positions: new entrants who yearly join the labor force seeking work (mostly youths needing vocational education), and those already in the labor force in the beginning of the year, employed or not (mostly adults).

Balance Between Vocational Education Capacity and Labor Market Requirements

We can now establish an indicator to measure the effectiveness in simple quantitative terms of the vocational education capacity, comparing it to the requirements of the labor market and labor force. This is not a measurement of the equilibrium between supply of (skilled) labor and demand for it by the market, but a balance between the capacity of the vocational education system to supply skilled and semiskilled workers to the market and to attend to the needs of the growing labor force relative to vocational education.

To understand this need, it is necessary to return to the fundamental concept of vocational education (cited under DEFINITIONS) that does not respond only to the market (enterprises) objective demanding skills. The labor force demand for vocational education is broader because it is "aimed at the interests of the worker, who will acquire the preparation for his job and his human accomplishment." Indeed, one must stress that every citizen has the constitutional right to an education. In other words, the needs from the point of view of

the labor force are not strictly limited to the market's demand. They are also a function of human accomplishment of the self-employed and underemployed in the nonformal market. However, due to the extremely scarce resources it is impossible to provide vocational education for the entire labor force, and some priorities must be established to decide which part of the labor force should receive vocational education.

As an hypothesis, priority can be given first to the employed, excluding, therefore, those who are not working, assuming that a certain proportion will remain unemployed. Secondly, a priority can be given to those who will work in skilled and semiskilled occupations, excluding, therefore, the unskilled. It is assumed that about 25% of the labor force is in this category. Finally, the professionals at a higher education level will be excluded from the new entrants' category, because their education is guaranteed by the Ministry of Education and thus is not a part of the National System of Vocational Education.

For the calculations of the net requirements for new entrants, growth rates of normal economic periods (the 1970's) are applied and not the doubled rates which occurred in the recession period.

Table C represents the net requirements and balances for new entrants and for those already included in the labor force. We make here an assumption that, on the average, skilled workers need ten hours of average education. The macro data may be misleading because courses range from one meeting to a full program of one to two years. Since it is impossible to forecast the composition of needed vocational education by duration, our assumption may be used as a working hypothesis. With this assumption, and despite the high incidence of unemployment and unskilled jobs which reduce drastically the net requirements, the total net deficit of capacity of vocational education is large. In fact only half of the net requirements for new entrants can be met by the National System of Vocational Education and only 8% of the net requirements for adult workers are met. Because of our asumptions, further research is necessary to assess why, where, and how resources should be used. A first attempt to increase the knowledge about the relationship between vocational education and industrial production is made in the following sections.

The Dimension of Industrial Production

Sectoral production, in raw figures, is given in Table D. To the best of our knowledge, vocational training in Brazil as a function of sectoral physical production has not been undertaken previously. True, there are studies analyzing subsectors like the steel industry, petroleum, and petro-chemistry (SENAI, Departmento Nacional), or, at a regional level, the construction industry. (SENAI, Departmento R. do Distrito Federal)

The major problem for this type of analysis is data inconsistency. For such an analysis, data is needed on sectoral production (supplied by the Statistical Institute (IBGE)), employment (supplied by the IBGE and reinterpreted by the Secretariat of Manpower of the Ministry of Labor) and vocational education (supplied by SENAI, SENAC and the NSVE).

Definitions, classifications, and time periods are often quite different, forcing us to use proxies and to aggregate most variables. The 36 industrial sectors needed to be aggregated to 11, and the 345 occupational groups were aggregated to 7.

STATISTICAL INTERPRETATION OF PRODUCTION, EMPLOYMENT AND VOCATIONAL EDUCATION

Since 1974, vocational education data have been classified similarly to the standard industrial classification used by the Statistical Institute in the industrial census and surveys. The Fundacao Getulio Vargas (FGV) calculates monthly the indicators of industrial activity, using data collected by the Statistical Institute (IBGE). The industrial production is measured as an index, with the base year 1975 = 100 and with absolute numbers of the 1975 industrial census.

For 1982, indexes of 17 industrial subsectors of the manufacturing industry are published monthly. The annual average is calculated by adding the monthly values and dividing the sum by 12. Five sectors are not considered in the FGV's calculations: timber industry, furniture, leather, printing, and diverse industries. It is assumed that these five industries performed at the general level of the manufacturing industry. Thus, they are given the average index of the manufacturing industry.

For 1975, the Statistical Institute's industrial census provides the values of production in Brazilian cruzeiros. Using the index of 1982, it is possible to calculate the real values of the production in 1982 at constant prices of 1975 and to measure the real change between 1975 and 1982, as shown in Table D. This table aggregates the 22 IBGE subsectors and 17 FGV subsectors into 11 subsectors to make them comparable with the data of the vocational education sectors, presented in Table F.1.

According to Table D, between 1975 and 1982, the value of production in constant (deflated) cruzeiros did not change significantly. Industrial production increased considerably to 1979, when the second petroleum crisis sent the economy into a deep dive that leveled these seven years at near zero (or exactly .6%) industrial growth. The difference among sectors is minimal from -0.7% (for mining) to +.19% (for textile and clothing). But this bouncing up and down had great effects on labor requirements and, therefore, on vocational training.

Employment

The employment data for 1975 and 1982, respectively, are shown in Table E.1. These data for industrial sectors (1-22) originate with the Ministry of Labor and IBGE, while for the remaining sectors we used a general proxy for disaggregating the total, based on data of the industrial sector. Regardless of the proxies used, it is strange that in a period of no growth the labor force should have increased by 53%. Only the tobacco industry witnessed a decline in the number of workers employed; all other sectors experienced an increase over the period (1975-1982) from 11% for chemicals to 58% for the clothing industry.

This anomaly can be explained by the inconsistency of the data.

For 1975, the source of the employment data is the industrial census. For the other sectors the average growth of the industry, as shown in Table E.2 is applied. The data in Table E.2, are aggregated in such a way as to be compatible with available vocational education data. The growth-rate (%-change) for the industrial sector is likely to be overstated for two reasons. First, the industrial census of 1975 considers only establishments with more than five employees, thus reducing the total number of employees, whereas the RAIS system also covers small establishments (less than six employees). Second, the 1982 sectoral distribution of RAIS was not available in time for the processing of the figures in the present study, so the sectors are distributed according to the 1980 sectoral proportions. This leads to overstatement, since the industry grew at a much lower rate between 1980 and 1982 than the other sectors. As a matter of fact, 1981 data (RAIS) evidence a decrease of about 14% in the metallurgical, mechnical, electrical and automobile industries. When the Ministry of Labor published the 1982 RAIS data disaggregated by sector (Comunicacoes Tecnicas, May 1984, pp. 6-10), it was confirmed that the figures extrapolated for the industrial sectors were overestimated.

In fact, 17 industrial sectors decreased employment by up to 27% (mechanical industry) between 1980 and 1982, and only 6 sectors increased the number of their workers (between 0.1% and 11.2%). The average decrease of the industries' employment was 8%, whereas the total employment in all sectors in the formal market increased by 4%. That means that the tertiary sector absorbed a large quantity of workers coming from the secondary sector or even from the nonformal market, causing a temporary structural change.

An attempt has also been made to assess changes in productivity over this period, but data inconsistency induced us to abandon the effort.

Vocational Education

Table F.1 presents the amount of man-hours of vocational education supplied to the industrial sector. Man-hours (or student-hours) are the most suitable variable to measure the quantitative outcomes of vocational education. Dividing this variable by the duration (shorter or longer) of the courses, the number of graduates in the two principal types of courses can be estimated.

The National Service of Industrial Apprenticeship (SENAI) has used the variable student-hours since the 1970's; the figures of Table F.1 are thus taken directly from SENAI's annual reports. However, only in 1974 are the data classified by sectors. Since the distribution by sector changes little from one year to another, the 1975 results are distributed in sectors according to the proportions of 1974.

For 1982, the sectors were determined by occupations. Previous studies have shown that on a national level the percentage-distribution of workers by occupation groups is similar to their distribution by major sectors of the economy. This is valid also for the distribution

by subsectors in the manufacturing industry.

The data of Table F.1 are quite consistent with the trends in economic development between 1975 and 1982. The decrease in man-hours in the extra-active non-metalic minerals industry is due to the sharp decline of the construction industry since 1980. The above average increase of man-hours supplied to certain sectors is explained by the introduction of new programs, especially in the food industry which had low enrollments in the 1970's and which did not decrease despite recession. The average change of vocational education output corresponds reasonably to the average change of employment in the same periods.

This behavior is evidenced in Table F.2, which shows the rates of change of vocational education and employment that occurred between 1975 and 1982. These data indicate that the vocational education supplied to the formal industrial sector responded adequately to the change of industrial requirements, in quantitative terms.

Finally, Table F.3 represents the evolution of the educational level of the workers in the formal market (all 36 sectors). The 1982 data are collected by RAIS, but excludes the non-valid registers (occupation or education not informed); therefore the total number of workers is different from the total in Table E.1.

For 1975, the distribution of the levels is calculated using the 1979 RAIS data as a proxy. The results indicate that low education levels still prevail even in this privileged formal sector, which constitutes a strong handicap for vocational education, since a successful vocational education depends very much on a complete basic or primary education.

Analyzing the percentage changes by educational level, we observe that those who concluded higher education (level 8) and high school (level 6) enlarged their proportion. Analyzed by occupational group, the strongest changes are in agriculture and the smallest in administration (negative) and industrial occupations; these latter increased mostly at the lower secondary level.

Yet it is difficult to assess whether vocational education responded to the cyclical fluctuation of the economy. Between 1975 and 1980 vocational education supply was certainly not larger than demand. After 1980, many industrial workers were laid off, first the unskilled and lower skilled and then many of the skilled workers.

However, there has not been an oversupply of vocational education. First, because the deficit of vocational education capacity was large during the economic expansion, so that only in the very long run was it possible to provide a substantial part of the working labor force with sufficient vocational education. Second, because economic cyclical fluctuation should play a minimal role in vocational education planning. Basic vocational education should not decrease just because of a sudden recession. In fact, the labor force is increasing at high rates independently of recession. Third, recession in developing countries does not mean a sharp increase in unemployment, but rather a very high rate of underemployment, and underemployed people need vocational

education too. Finally, the high quality and large quantity of vocational education supplied to the industrial labor force contributed to an increase in the competitiveness of Brazilian manufactured goods in the international markets. Brazilian manufactures grew considerably despite the world recession and the protectionist measures of developed countries.

Another question is the sectoral distribution of vocational education. Table G.1 shows the percentage distribution of labor and vocational education by sector. Over time, sectors 10 to 15 and 18 to 20 showed a remarkable increase in man-hours of vocational education, whereas sectors 1, 2 and 24 diminished their proportion of man-hours. All other sectors remained more or less stable. This is explained by the decline of the construction industry (sector 24) and the non-metallic goods industry (sectors 1 and 2). The larger shares are explained by the better coverage of the leather and plastic industries (11 and 15).

Table G.2 shows the ratios of the shares, or percentage distributions, by sectors. The deviations from the perfect ratio (1) are considerable. The mechanical, automobile, and electrical sectors on one hand and the leather industry on the other, which are the more important export industries, call for a higher concentration of vocational education man-hours supplied than most other industries.

This exercise is meant to assess the vocational education process as a function of industrial production. Here we offer it only as an indication of the type of data needed to analyze and plan training of the labor force in Brazil. The major problem is the non-availability and, when available, largely inconsistent body of data. We appreciate the voluminous materials supplied by various government or quasi-government agencies but we could not always reconcile either raw or secondary data. To be able to systematically analyze vocational training in Brazil, considerable effort is still required in assembling historical economic and demographic data.

TABLE A

CAPACITY OR "SUPPLY" OF VOCATIONAL EDUCATION

TYPE, LEVEL		CAPACITY GRADUATES PER YEAR
A.1	LONG DURATION VOCATIONAL EDUCATION	
A.1.1	Below high school level occupations	621,800
A.1.2	High school level occupations	16,900
A.1.3	Professional level (is not part of the National System of Vocational Education)	(-)
	SUBTOTAL A.1	638,700
A.2	SHORT DURATION VOCATIONAL EDUCATION	
A.2.1.	All levels	2,243,422
	A.1 + A.2 = TOTAL CAPACITY.....	2,882,122

POSITION		CAPACITY GRADUATES PER YEAR
A.3	VOCATIONAL EDUCATION DIRECTED TO NEW ENTRANTS (YOUTHS)	408,222
A.4	VOCATIONAL EDUCATION DIRECTED TO OCCUPIED LABOR FORCE (ADULTS)	2,473,900
	A.3 + A.4 = TOTAL CAPACITY.....	2,882,122

Source: Information System of Vocational Education (SSINFMO). Report 1982, Secretariat of Manpower of the Ministry of Labor.

This capacity or "supply" is compared in the next two sections with the requirements or "demand", Tables B and C.

TABLE B

LABOR FORCE BY EMPLOYMENT STATUS

B.1 LABOR FORCE BY EMPLOYMENT STATUS	NUMBER	PERCENT
B.1.1 Employed	25,000,000	50.0
B.1.2 Underemployed	23,000,000	46.0
B.1.3. Unemployed (overt)	2,000,000	4.0
TOTAL LABOR FORCE	50,000,000	100.0

B.2 LABOR FORCE BY MARKET	NUMBER	PERCENT
B.2.1 Formal, "primary" market	18,000,000	37.7
B.2.2 Nonformal, "secondary" market	30,000,000	62.5
TOTAL OCCUPIED LABOR FORCE	48,000,000	100.0

B.3 LABOR FORCE BY POSITION	NUMBER	PERCENT
B.3.1 New entrants during the	1,500,000	3.0
B.3.2 Already joined the labor (adults)	48,500,000	97.0
TOTAL LABOR FORCE	50,000,000	100.0

Sources: For B.1:
Statistical Institute (IBGE). Annual Household Survey, 1982. (Numbers are rounded.)

For B.2 and B.3:
Definitions and calculations by Secretariat of Manpower, Ministry of Labor.

TABLE C

NET REQUIREMENTS AND BALANCE

POSITION	NUMBER
C.1 NET REQUIREMENTS FOR NEW ENTRANTS (YOUTHS) - ANNUAL	
Total number of new entrants in recession periods	3,000,000
Total number of new entrants in normal periods	1,500,000
- less those who remained unemployed	300,000
- less those who need no vocational education	375,000
- less professionals (not a part of NSVE)	72,000
SUBTOTAL.....	753,000
C.2 NET REQUIREMENTS FOR STOCK OF LABOR FORCE (ADULTS) (Assuming that every skilled or semiskilled worker needs on the average 10 hours a year of continuing education.)	
Total number of those who are already in the LF	48,500,000
- less the unemployed	2,000,000
- less those who need no vocational education	12,250,000
SUBTOTAL.....	34,000,000
C.3 BALANCE FOR NEW ENTRANTS (YOUTHS) - ANNUAL	
Net Requirements	735,000
Capacity of Vocational Education	408,222
NET DEFICIT OF VOCATIONAL EDUCATION.....	344,778
C.4 BALANCE FOR STOCK OF LABOR FORCE (ADULTS)	
Net Requirements	34,000,000
Capacity of Vocational Education	2,473,900
NET DEFICIT OF VOCATIONAL EDUCATION.....	31,526,100
C.5 TOTAL BALANCE	
C.3 + C.4 = TOTAL NET DEFICIT.....	(31,870,878)

Source: Tables A and B:
Paul Ammann, Balanco da formacao profissional, Brasil 1982, Brasilia, Secretaria de Mao-de-Obra, 1983.

TABLE D

PRODUCTION OF THE MANUFACTURING SECTOR
(Value of Brazilian Cruzeiros at 1975 Prices)

SECTOR	PRODUCTION 1975	PRODUCTION 1982	PERCENT CHANGE IN PRODUCTION 1975-1982
01-02	30548	30334	-0.007005
03	103360	103050	-0.002999
04,06	131794	132585	0.006002
05	38490	38913	0.010990
07-08	27524	27662	0.005014
09,21	34762	34762	0.000000
10,12,13,15	164832	165327	0.003003
11	29570	29718	0.005005
16-17	51464	52442	0.019004
18-20	132503	134358	0.014000
22	27434	27814	0.012007
TOTAL	772331	776965	0.006000

Source: Fundacao Getulio Vargas. Conjuntura, September 1983, p. 136 and IBGE, Censo Industrial, 1975.

Note: Sector classifications are shown in Appendix A.

TABLE E.1

EMPLOYMENT IN THE FORMAL MARKET

SECTOR	EMPLOYED 1975	EMPLOYED 1982	PERCENT CHANGE EMPLOYED 1975-1982
01	60263	90649	0.504223
02	273507	403232	0.474302
03	429958	570130	0.326013
04	386876	557751	0.441679
05	174344	261987	0.497548
06	217843	286707	0.316118
07	180871	253442	0.401231
08	122690	171529	0.398068
09	85240	116774	0.369944
10	45442	60129	0.323203
11	34236	42682	0.246699
12	124376	178639	0.436282
13	32878	36677	0.115548
14	20586	25748	0.250753
15	78686	127064	0.614823
16	329664	428450	0.299657
17	291767	462441	0.584967
18	434953	613605	0.410739
19	50055	58074	0.160204
20	21530	20364	-0.054157
21	121013	142712	0.179311
22	294391	908887	2.087346
23	164170	250564	0.526247
24	749663	1144165	0.526238
25	139559	213001	0.526243
26	573761	875696	0.526238
27	163891	250138	0.526246
28	208268	317867	0.526240
29	86468	131971	0.526241
30	1370982	2092449	0.526241
31	50320	76800	0.526232
32	1596231	2436231	0.526240
33	657728	1003851	0.526240
34	72509	110666	0.526238
35	57740	88125	0.526238
36	2063559	3149486	0.526240
TOTAL	11766618	17958683	0.526240

Source: 1975: Sectors 1 to 22: IBGE, Censo Industrial
Sectors 23 to 36: estimated

1982: RAIS

TABLE E.2

EMPLOYMENT BY INDUSTRIAL SECTORS

SECTOR	EMPLOYED 1975	EMPLOYED 1982	PERCENT CHANGE EMPLOYED 1975-1982
01-02	333770	493881	0.479405
03	429958	540130	0.326013
04,06	604719	844458	0.396447
05	174944	261987	0.497548
07-08	303561	424971	0.399953
09,21	206253	259436	0.258096
10,12,13-15	301968	428257	0.412880
11	34236	42682	0.246699
16-17	621431	890891	0.433612
18-20	506538	692043	0.366221
22	294391	908887	2.087346
24	749663	1144165	0.526239
TOTAL	4561432	6961838	0.526240

Source: Table E.1

TABLE F.1

VOCATIONAL EDUCATION: MAN-HOURS PER YEAR

SECTOR	MAN-HOURS TRAINING 1975	MAN-HOURS TRAINING 1982	PERCENT CHANGE MAN-HOURS TRAINING 1975-1982
01-02	544064	312945	-0.424801
03	2759958	4556229	0.650833
04,06	36836972	54905594	0.490502
05	7868148	14715393	0.870249
07-08	2527370	2857405	0.130584
09,21	2297370	2158816	-0.060210
10,12,13,15	227922	787024	2.453041
11	1543752	4945189	2.203357
16-17	1750808	2908923	0.661475
18-20	28534	309104	9.832831
22	7952118	13129758	0.651102
24	2244377	1881250	-0.161794
TOTAL	66581149	103467630	0.554008

Source: Original Data: Reports SENAI 1975 and 1982, SSFINMO 1982

TABLE F.2

RATE OF CHANGE OF VOCATIONAL EDUCATION AND EMPLOYMENT 1975-1982

SECTOR		TRAINING/EMPLOYMENT
01-02		0.885546
03	1.996341	
04,06		1.237245
05	1.749075	
07-08		0.326498
09,21		0.233285
10,12,13-15		5.865432
11	8.931357	
16-17		1.525500
18-20		26.849447
22	0.311928	
24	0.307453	
TOTAL		1.052767

TABLE F.3

EMPLOYED BY OCCUPATION AND EDUCATION LEVELS

Employed by Occupation and Educational Levels 1975

	0	1	2	3	4
0	0	34557	95894	103847	116670
1	0	19552	48959	22538	28867
2	29440	149401	344039	302988	430768
3	14779	71883	185094	156810	151612
4	85838	335894	402204	126135	72191
5	77599	127376	55601	10028	3877
6	287262	1373444	1873105	583295	353965
TOTAL	489518	2112107	3004896	1305641	1157950

	5	6	7	8	TOTAL
0	71590	356745	103235	481155	1397240
1	19650	208567	37904	145226	536624
2	422046	628848	245160	159446	2753657
3	92502	87604	21887	14331	799707
4	21983	25631	4416	4152	1086297
5	1323	2040	287	514	283450
6	116393	88843	16115	14317	4831368
TOTAL	745487	1398278	399004	819141	11688646

Employed by Occupation and Educational Levels 1982

	0	1	2	3	4
0	0	42121	121359	115870	165891
1	0	14473	40507	17629	28494
2	68036	172333	409772	481276	608993
3	15827	80452	230568	213302	230326
4	111761	482888	580365	212063	126210
5	125523	244033	100771	21079	7343
6	328839	1662854	2351612	999437	5299771
TOTAL	649986	2699154	3834954	2060656	1697028

	5	6	7	8	TOTAL
0	110093	567482	173591	931006	2260654
1	18618	263138	30445	107635	533792
2	578936	1061609	329412	281722	4017814
3	142507	144402	31883	23283	1118696
4	35685	45498	8692	5371	1622726
5	2365	3960	578	812	511275
6	182756	142743	21334	20845	6274918
TOTAL	1070960	2228832	595935	1370674	16339875

TABLE F.3 (Continued)

Percent Change Employed by Occupation and Educational Level Coefficient 1982/1975

	0	1	2	3	4
0	0.000000	0.218885	0.265554	0.115776	0.421882
1	0.000000	-0.259769	-0.172634	-0.217810	-0.012921
2	1.311005	0.153493	0.191063	0.588433	0.413738
3	0.070911	0.119208	0.245681	0.360258	0.519181
4	0.301999	0.437620	0.442962	0.681238	0.748279
5	0.617585	0.915848	0.812395	1.402014	0.893990
6	0.166667	0.210719	0.255462	0.713433	0.496676
TOTAL	0.327808	0.277944	0.276235	0.578272	0.465545

	5	6	7	8	TOTAL
0	0.537827	0.590722	0.681513	0.934940	0.617943
1	-0.052579	0.261647	-0.196787	-0.258845	-0.005277
2	0.371737	0.688181	0.531009	0.766880	0.459083
3	0.540583	0.648349	0.456710	0.624660	0.398882
4	0.623300	0.775116	0.968297	0.293593	0.493814
5	0.787604	0.941176	1.013937	0.579767	0.803757
6	0.570163	0.606688	0.323860	0.455961	0.298787
TOTAL	0.436591	0.593983	0.493556	0.673307	0.397963

Source: 1982: RAIS; 1975: estimated.

TABLE G.1

PERCENTAGE DISTRIBUTION

	PRODUCTION		LABOR		MAN-HOUR VOC. ED.	
SECTOR	1975	1982	1975	1982	1975	1982
01-02	4.0	3.9	7.3	7.1	0.8	0.3
03	13.4	13.3	9.4	8.2	4.2	4.4
04,06	17.0	17.0	13.3	12.1	55.3	53.1
05	5.0	5.0	3.8	3.8	11.8	14.2
07,08	3.6	3.6	6.7	6.1	3.8	2.8
09,21	4.5	4.5	4.5	3.7	3.5	2.1
10,12-15	21.2	21.3	6.1	6.2	0.4	0.8
11	3.8	3.8	0.8	0.6	0.23	4.8
16,17	6.7	6.7	13.7	12.8	2.6	2.8
18,20	17.2	17.3	11.1	10.0	0.1	0.3
22	3.6	3.6	6.5	13.0	11.9	12.6
24	—	—	16.4	16.4	3.4	1.8

Source: Tables D, E.2 and F.1.

TABLE G.2

RATIOS OF MAN-HOUR SHARES OVER LABOR SHARES

01,02	Non-metal mineral	.1096	.0423
03	Metalurgy	.4468	.5366
04,06	Mechanical & Automobile	4.1579	4.3884
05	Electrical	3.1053	3.7368
07,08	Timber & Furniture	.5672	.4590
09,21	Paper & Printing	.7778	.5676
10,12-15	Rubber, Chemical, Pharmaceuticals & Plastics	.0606	.1290
11	Leather	2.8750	8.0000
16,17	Textile & Clothing	.1898	.2188
18-20	Food, Beverage & Tobacco	.0090	.3000
22	Diverse	1.8308	.9692
24	Construction	.2073	.1098

SYMBOLS OF COLUMNS AND ROWS
FOR TABLES

Education

0 = illiterate
1 = 1 to 3 years
2 = 4 years (primary completed)
3 = 5 to 7 years
4 = 8 years (secondary completed)
5 = 9 to 11 years
6 = 12 years (high school completed)
7 = 13 to 14 years
8 = more than 14 years (higher education completed)

Profession, Occupation groups

011-199	0	= professional
200-299	1	= administrators, directive jobs
300-399	2	= clerical
400-499	3	= commercial, sales
500-599	4	= tourism, hotel, restaurant and personal services
600-699	5	= agriculture
700-999	6	= industrial

Sectors

1 = extraction of minerals
2 = industry of non-metalic mineral goods
3 = metallurgy
4 = mechanical industry
5 = electrical and communication equipment
6 = automobile
7 = timber
8 = furniture
9 = paper
10 = rubber
11 = leather
12 = chemical
13 = pharmaceutical
14 = perfumes and soaps
15 = plastics
16 = textile
17 = clothing
18 = food
19 = beverage
20 = tobacco
21 = printing
22 = diverse industries
23 = public utilities
24 = construction

25 = agriculture
26 = transport
27 = communication
28 = hotel and restaurant
29 = maintenance and repair
30 = personal and commercial services
31 = banking
32 = commerce
33 = not classified
34 = cooperatives
35 = foundations
36 = public administration

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CHAPTER 8

THE LABOR MARKET IMPACTS OF VOCATIONAL EDUCATION PROGRAMS IN THE UNITED STATES

by
Andrew Sum*

This seminar on Vocational Education in Brazil is devoted primarily to an examination of key economic policy, planning, and program evaluation issues relevant to the future design and administration of vocational programs in Brazil. The following paper on the impacts of vocational education programs in the U.S. has been prepared to complement the presentations on evaluations of vocational education programs in Brazil. The empirical findings appearing in this paper together with the discussion of their policy and program planning implications will, we hope, provide a useful comparative basis for an assessment of available findings on the effectiveness of vocational programs in Brazil and future research and evaluation needs of that country.

The selection of Boston and Weston, Massachusetts as sites for this seminar on vocational education seems particularly appropriate, given the past history of the city and state in influencing educational policies of the nation. The city of Boston served as the home for the first public high school in the United States.[1] The English Classical School was a free, publicly-funded institution designed to provide the youths of working class families an opportunity to obtain an education and to secure training for the world of work outside the apprenticeship system. Many of the educational reformers in the Commonwealth during the 19th century promoted education as a critical factor in the economic development of Massachusetts.[2] Education was, thus, viewed as an indispensable element for economic growth well before the human capital revolution took hold in the economics profession of the U.S.

Nearly eighty years ago, back in 1905, the Governor of the Commonwealth, Governor Douglas, appointed a commission to study the need for a statewide vocational education system to supply industries' needs for skilled workers and to increased the "industrial intelligence" of the state's labor force.[3] The Douglas Commission completed its work in 1906 and issued a report supporting the case for a state vocational education system, and its recommendations were largely accepted by the legislature and became law in that year. Massachusetts was the first state to provide funding for such a statewide vocational education system. This year, 1984, marks the 70th anniversary of the appointment of the 1914 Presidential Commission on National Aid to Vocational Educa-

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tion, which issued a report recommending federal support for vocational education. A leading figure on that commission was Charles Prossner, the state director of vocational education in Massachusetts. The commission's report eventually influenced the passage, in 1917, of the Vocational Education Act, generally referred to as the Smith-Hughes Act, which provided federal support for vocational education programs at the state and local level. At this very moment, the Congress of the United States is debating the merits of vocational education in its deliberations over the reauthorization of the nation's vocational education legislation. (These debates eventually led to legislation reauthorizing the vocational education act. The act is known as the Carl D. Perkins Vocational Education Act of 1984 in honor of the recently departed Carl Perkins, a key supporter of education and training legislation in the House of Representatives).

This paper will cover four basic topics. First, we will review the nature of the current debates taking place in the United States with respect to the appropriate role of vocational education programs in the high schools of the nation. Second, we will briefly discuss a number of key conceptual and methodological issues involved in estimating the labor market impacts of vocational education programs. Third, we will review major findings of seven evaluation studies designed to estimate the employment and earnings impacts of vocational education programs in the U.S. Finally, we will synthesize the findings of these studies and assess their implications for the design and administration of future vocational education programs in the U.S. Where relevant, we will compare and contrast these findings for the U.S. with results of previous vocational training program evaluations in Brazil.

The Current Vocational Education Debate

Since its inception, the public vocational education system in the U.S. has been a major source of controversy among educators, the business community, labor unions, policymakers, and the public at large. Today's debates over the appropriate role of vocational education programs in the high schools of the U.S., thus, do not represent any major departure from past practice. The entire educational system of the country has been scrutinized carefully during the past few years at the national, state, and local level. The recent report of the National Commission on Excellence in Education has itself ignited further debate over the need for reforms in the secondary school system of the nation.

Currently, there are many different views with respect to the appropriate role of vocational education in the secondary schools. We shall briefly summarize the views of three separate camps: those who would eliminate vocational education as a separate curriculum in the high schools; those who would reform, but not necessarily expand, the existing system in several key areas; and those who would seek both to strengthen and expand the existing system. The views of the first group are well represented in the publications of the Paideia Group, the report on high schools by the Carnegie Foundation for the Advancement of Teaching, and the report of the National Academy of Sciences

panel on School and the Workplace.[4] For example, in The Paideia Proposal, the authors state the following:

> The twelve years of basic schooling must prepare them (the students) for this task (that of earning a living), not by training them for one or another particular job in our industrial economy, but by giving them the basic skills that are common to all work in a society such as ours.
>
> ...every child is educable up to his or her capacity. Educable -- not just trainable for jobs. As John Dewey said almost a century ago, vocational training, training for particular jobs, is not the education of free men and women.[5]

The view of the Paideia Group that high schools should eliminate the existing multiple track system and substitute one common track for all pupils is largely shared by Ernest Boyer in his recent volume High School prepared under the auspices of the The Carnegie Foundation for the Advancement of Teaching.[6] Boyer's critique of the existing vocational education system is based on the perceptions of the panel members and findings of a few evaluation studies that indicate: vocational education has limited impacts upon the post-high school employment and earnings of participants; and, vocational education programs fail to equip participants with appropriate academic skills and restrict their future academic options. These groups would have high schools provide a limited amount of manual training to students (as practical application of theoretical knowledge) and provide instruction in career planning and world of work behavior; however, specialization in a particular occupational field during high school would be eliminated.[7] Such specialized training would be delayed until the post-secondary level of education.

The views of the second group of "vocational education reformers" are well represented in recent reports by the National Commission for Employment Policy and the National Research Council.[8] These groups do not advocate the elimination of vocational training in the high school, but rather recommend a number of substantive reforms in the existing system and, in some cases, the methods by which it is financed. First, these groups recognize the need to strengthen the basic academic competencies of vocational education students, and some would divert a portion of federal vocational education monies to expanding remediation programs in the high schools. The Congress itself has recognized such a need in the passage of the 1984 Carl Perkins Vocational Education Act. Second, the vocational education system would expand training services to students in communities whose high schools have high concentrations of educationally and economically disadvantaged students. Third, the skills of teachers and administrators of vocational education programs need to be constantly upgraded, and increased investment funds for purchases of modern equipment and tools need to be made available to local vocational education programs. Finally, increased ongoing efforts must be made to strengthen ties between local vocational programs and the business community to improve employment prospects for graduates of the vocational education system.

Finally, there are those who support strengthening and expanding the nation's vocational education system. These include the leadership of the American Vocational Association and The National Commission on Secondary Vocational Education.[9] The advocates of expansion argue that the increasing pace of technological change in American industry and the defense needs of the nation require a greater commitment to the training and retraining of the nation's work force. As Gene Bottoms of the American Vocational Association recently noted "A $1.4 trillion investment in sophisticated machinery and weapons will not take care of our nation's defense needs if we do not have trained people to build and operate this equipment." Increased academic training at the expense of vocational training is, according to these groups, not an effective solution to the employment problems of the nation. Vocational education programs can contribute to the development of an effectively trained and adaptable work force, particularly if program staff can be upgraded, businesses and unions take a greater interest in the existing system, access to programs by students is enhanced, and increased opportunities are made available to students for working at related jobs while attending school.

Evaluating the Impact of Vocational Education Programs

As noted above, the debates over the appropriate role of vocational education in the high schools are partly focused on perceptions of the effectiveness of such programs in promoting the long-term employability and earnings of youths enrolled in such programs. Obtaining statistically reliable estimates of the labor market impacts of such programs is quite difficult. There are a number of complex conceptual and methodological issues involved in measuring such impacts.

For example, one cannot estimate the labor market impacts of vocational education programs simply by observing the actual employment and earnings experiences of graduates during some time period after high school. One needs to know how well they would have done in the absence of such training interventions. Ideally, a control group developed as part of an experimental design would be available to evaluators interested in assessing the impacts of vocational education programs; however, no such randomly assigned treatment and control groups exist. Evaluators must, therefore, use comparison groups, primarily consisting of similar students who either did not enroll in vocational programs during high school or enrolled in only a limited number of such courses, to estimate the net impacts of vocational programs. Simple comparisons of raw, unadjusted mean data for such groups cannot suffice. Efforts must also be made to statistically control for pre-existing differences between the two groups in terms of demographic characteristics, socio-economic backgrounds, mental ability, and geographic location. Multivariate statistical procedures, therefore, must be used to estimate the net impacts of vocational education programs.

During the past decade, a number of different evaluations of the labor market effects of vocational education programs have been conducted. These studies (though varying in scope) have attempted to answer

a number of different questions about the labor market impacts of vocational programs. Among the key issues to be addressed are the following:

(i) Do vocational education programs appear to significantly improve the labor market experiences of participants? If so, which labor market outcomes (weeks of employment, hours of work, weekly earnings, annual income, job satisfaction) appear to be most positively affected by participation in such programs.?

(ii) How long lasting are these labor market impacts? Do they persist over considerable periods (10 years) or do they tend to fade quickly after initial entry into the labor market?

(iii) Does vocational education improve labor market outcomes for all subgroups of participants or do certain demographic/socioeconomic subgroups benefit to a greater extent from participation in such programs? If the latter situation holds true, which subgroups appear to benefit the most from such programs?

(v) What other factors (in-school work experience, basic academic skills, placement in related jobs) potentially controllable by vocational education administrators and teachers appear to significantly influence the labor market success of high school graduates?

(vi) Do vocational education programs generate benefits to individuals other than the participants themselves? In particular, do employers appear to benefit from the provision of vocational training?

Given these key questions about the effectiveness of vocational education programs, let us turn to an examination of available empirical evidence on the above issues.

The Employment, Wages, and Earnings Impacts of Vocational Education Programs in the U.S.

This section of the paper reviews the effects that secondary level vocational education programs have had on labor force behavior, employment, hourly and/or weekly wages, and annual earnings of participants in such programs. The findings of seven separate evaluation studies are examined. Six of these are based on national longitudinal data bases. One was conducted in the Boston metropolitan area by Professors Horowitz, Herrnstadt, and myself during the 1970's. During the past decade, the availability of several sets of national longitudinal survey data on the labor force, schooling, employment and earnings experiences of nationally representative samples of young people have enabled employment and training researchers to estimate the economic effects of education and training investments in a more rigorous manner than was heretofore possible.[11] At the same time, however, it must be recognized that none of the available findings on the effectiveness of vocational education programs are based on an experimental evaluation design using random assignment of students to alternative types of high school or post-high school curricula.[12]

The first study reviewed is one conducted by Parnes and Kohen.[13] The authors used data from the National Longitudinal Surveys of Young Men and Young Women, which were initially funded by the U.S. Department of Labor in the late 1960's. These national longitudinal surveys involved annual interviews with a nationally representative sample of young men and young women, who were 14-21 years of age when they were first interviewed (1966 for men, 1968 for women). The authors selected a sample of individuals from the national data base to conduct an analysis of the labor market and earnings experiences of these young men and women over time. Individuals selected for the analysis were those who had not been enrolled in school in either 1968 or 1971 and had not graduated from college, i.e., had completed fifteen or fewer years of schooling. The authors analyzed a number of labor market outcomes, including the following three cross-sectional measures: unemployment experiences during calendar year 1970, average hourly wages on current jobs (1971), and the socioeconomic status of jobs held at the time of the 1971 interview.[14] Multivariate statistical procedures were employed to isolate the influences of key human capital, demographic, socioeconomic, and unionization variables on these labor market outcomes.

Among the major findings of this study were the following four. First, educational attainment as measured by years of schooling completed had a consistent and substantial impact upon both the hourly earnings and socioeconomic status of each sex/race subgroup. Men and women, whites and blacks completing more years of formal schooling tended to achieve significantly higher hourly earnings and obtain jobs with higher socioeconomic status. Second, high school curriculum as reported by respondents failed to significantly affect these labor market outcomes. Controlling for years of schooling completed, vocational education students tended to receive hourly earnings and obtain jobs characterized by a socioeconomic status similar to those obtained by general academic and college preparatory students. No statistically significant differences emerged across high school curricula. Third, formal training after high school tended to significantly boost the hourly earnings and socioeconomic status of white males, but only marginally affected outcomes for black males and for women of both races. Interpreting this latter finding for policymaking purposes was complicated by the hybrid nature of the post-high school training variable. This particular program variable encompassed such diverse training programs as post-secondary trade and vocational schools, technical training institutes, apprenticeship programs, and company-sponsored formal training programs.[15] Finally, the authors found that those young persons employed in jobs governed by a collective bargaining agreement, particularly males, received substantially higher hourly earnings. For men, the hourly wage advantage was nearly 30%. More recent research on the types of jobs and hourly earnings of male high school graduates has revealed that male vocational education graduates are significantly less likely than their counterparts enrolled in other curricula to obtain jobs in unionized establishments.[16] This reduced likelihood of unionized employment does have an adverse impact upon the hourly earnings of male vocational graduates.

The second study of the effects of vocational education and training is that of Grasso and Shea.[17] These two individuals undertook a comprehensive analysis of the outcomes of vocational training education for the Carnegie Council on Policy Studies in Higher Education. As in the Parnes/Kohen study, the research findings were also based on the national longitudinal surveys of young men and women that were funded by the U.S. Department of Labor. The sample of young adults included in that portion of the study being reviewed consisted of young males (19-26) who were not enrolled in school during 1971 and who had completed exactly twelve years of schooling and young women who were not enrolled in school at any time during 1972 and who completed exactly 12 years of schooling at the time of the interview. A diverse number of labor market outcome variables were analyzed by the authors, including the hourly rate of pay received by men and women employed at the time of the survey, the change in hourly rates of pay between 1966 and 1971, the annual wage or salary income received by men and women in the calendar year prior to the survey, the socioeconomic status of the jobs held by men and women, and the degree of their satisfaction with jobs currently held.

Among the major findings of this study with respect to the impacts of vocational education at the secondary and post-secondary level are the following five points. First, the high school curriculum in which young males, both black and white, were enrolled had no statistically significant impact on any of the employment and earnings outcomes. Males who were enrolled in a vocational education curriculum did as well, but no better, than those who were enrolled in the general academic and college preparatory curricula. Second, training after high school had positive and statistically significant impacts on practically all employment, hourly earnings, and socioeconomic status outcomes for white and black males. This finding is similar to that in the Parnes/Kohn study.

Third, white and black women enrolled in business and office occupational training programs during high school typically tended to typically achieve significantly higher hourly wages, higher annual incomes, and jobs with higher socioeconomic status than their counterparts enrolled in the general academic programs. This finding that vocational training in high school, especially in the business and office occupations, tends to produce greater employment and earnings benefits for women than for men has been found in a number of other evaluations of vocational training, including several of those reviewed in this paper. Explanations of this particular finding are diverse; however, most analysts attribute it to the more general nature of the training provided to women in the clerical and business occupations, the relevance of the training provided to the actual job duties performed by workers in such occupations, and favorable growth in employment opportunities for workers in such occupations.

Fourth, training after high school produces small positive gains in average hourly earnings for white women and increases the socioeconomic status of jobs held by both white and black women. Finally, vocational program graduates (whites and blacks, men and women) were significantly more likely than their counterparts in the general academic programs to report greater satisfaction with their jobs. These results

held true for males as well as females even though that male vocational education graduates did not earn significantly higher wages than their general academic counterparts. This finding seems to suggest that vocational graduates receive higher non-pecuniary benefits from employment than their counterparts in the general academic and college prep curricula.

The third study being reviewed is an evaluation of the effectiveness of cooperative vocational education and work-study programs in selected high schools in the Boston metropolitan area during the early 1970's. This study was sponsored by the U.S. Department of Labor and, as noted earlier, was carried out by three faculty members in the Department of Economics of Northeastern University, including the author of this report.[18]

The primary purpose of this study was to ascertain whether participation in a cooperative vocational program during the high school years facilitated the transition from high school to the world of work upon graduation. The transition process was measured not only by the length of time required by students to obtain their first full-time job after graduation, but also by the degree of their civilian labor force attachment, weeks of employment, weeks of unemployment, and hourly and weekly wages during the first eighteen months following graduation. The sample of students consisted of approximately 430 males from the graduating class of 1972. They attended eighteen different high schools in the Boston metropolitan area, including central city high schools and schools in nearby suburban communities. Students in four types of high school programs were represented in our sample. These were general academic, work study, regular vocational, and cooperative vocational programs. These students were first interviewed during their senior year of high school. At that time, comprehensive demographic and socioeconomic background data were collected from students as were work history and schooling data for both junior and senior years of high school. Follow-up interviews were conducted with this sample of students to obtain information on their labor force, employment, wages and schooling experiences during the first eighteen months following graduation from high school.

The findings of this study revealed that, in the aggregate, students who participated in cooperative vocational programs did not achieve significantly better labor market outcomes relative to general academic students or those enrolled in other programs. Cooperative vocational students did, however, express a higher degree of satisfaction with their current or most recent jobs. Analysis on several of the labor force participation and employment measures revealed the important role played by early work experience. Those students who worked more frequently during the junior and senior years of high school tended to participate in the labor force more frequently, obtain a greater number of weeks of employment, avoid unemployment problems to a greater degree, and earn higher hourly wages.

A more disaggregated analysis of the impacts of alternative types of high school programs yielded the finding that graduates of particular types of programs, such as high support work-study, cooperative

electrical, and machine trades, obtained significantly better labor market outcomes. These programs tended to be characterized by close working relationships with private sector employers, by active and intensive job development and placement efforts on behalf of students during and after high school, and by the provision of frequent follow-up and personal support services for these students. The study's major findings indicate that school-to-work programs, such as cooperative vocational and work study programs, can make a difference. To do so, however, they must provide students an opportunity to obtain intensive exposure to the job market during high school, maintain close links with the local employer community, and provide a job recruitment and referral service that meets the needs of both students and employers over the long run.

The fourth study being reviewed was carried out by Meyer and Wise at the National Bureau of Economic Research.[19] Their study is focused on an analysis of the school to work and school to school transition process for white and black male youths who graduated from high school in 1972. The data base used in the study is that of the National Longitudinal Study of the High School Class of 1972. This survey was funded by the National Center for Educational Statistics. The first round of interviews was conducted during the spring of 1972 with a sample of approximately 23,000 high school seniors. Students were selected from a national sample of high schools, with some over-sampling of high schools in low socioeconomic areas. Follow-up interviews were carried out in 1973, 1974, 1976, and 1979.

The authors of this study attempted to estimate the determinants of the number of weeks of employment obtained by white and minority male high school graduates during the first and third year following graduation. Separate estimates were provided for students in post-secondary schools and non-students in each of these years. One of the variables used in these estimating equations represented the respondent's training status during high school. Respondents were asked if they had received any "specialized job training" during high school. Those who responded "yes" to this question were classified as vocational training participants. This variable is an admittedly crude one, providing no information on the intensity or type of training received in high school. A more comprehensive set of human capital variables are used in these models, including number of hours worked during high school, class rank and achievement test scores. Findings of the effects of these variables on weeks of employment will be summarized as well.

For white males, job training received during high school typically does not significantly affect weeks of employment obtained either one year or three years after graduation from high school. The one exception to this finding was for persons who were attending post-secondary educational or training institutions in the third year of the follow-up period. Among enrolled persons, white males who received specialized job training during high school did experience significantly higher employment (four to five weeks more during the year).

Among black males, somewhat similar findings emerge with one major exception. Non-enrolled black males who received specialized job training during high school did obtain significantly more weeks of employment during the first year following graduation; however, as was true for white males, the employment impact was not statistically significant in the third year. Among enrolled black males, those individuals who received specialized job training were employed for a significantly greater number of weeks in the third year following graduation. Overall, the findings indicate that the employment effects of job training during high school for males who do not go on to further schooling are small and frequently not statistically significant. These findings are in close accord with those of Parnes/Kohen and Grasso/Shea. The favorable employment impacts for enrolled black and white males are somewhat difficult to interpret. Since attendance in post-secondary schooling is positively influenced by class rank and achievement test scores, these results may imply that the more academically inclined, vocational education student benefits more from job training. Research findings of Grasso/Shea do provide support for such a view. On the other hand, it may well be that former vocational education students who attend post-secondary schools are more likely to enroll in trade/technical schools or two year colleges closer to their homes that provide greater opportunities to combine work with schooling.

Other key findings of the analysis included the positive and statistically significant effects of in-school work experience, basic skills, and class rank upon weeks of employment obtained by male graduates, both black and white. Hours worked per week during high school was a powerful, positive determinant of weeks of employment obtained by graduates in the first and third year following graduation from high school. Sizes of these effects were similar for both whites and blacks. For those graduates who did not enroll in post-secondary school, scores on standard achievement tests and class rank raised significantly the weeks of employment obtained during this three year period. Early work experience and solid basic academic skills (vocabulary, reading, math) were found to be key determinants of the employment experiences of both white and black youth who directly entered the labor market upon graduation.

The fifth study examined in this paper is that recently completed by Robert Meyer.[20] His analysis of the effects of high school training differs in a number of key respects from that reported above. First, the study analyzes the impacts of vocational training in high school for women as well as for men and for members of selected racial/ethnic subgroups in each sex category. Second, the analysis is longer-term in nature. The author uses the findings from eight full years of interviewing from the National Longitudinal Study of the Class of 1972. Third, more comprehensive measures of labor market outcomes are examined, including hours of work, weekly wages, and annual incomes. The annual incomes variable is a more desirable measure of the impacts of training programs since it is the key element of any benefit-cost analysis of education and training investments. In addition, annual incomes are themselves influenced by a combination of labor market variables (labor force participation, employment while

active in the labor force, hours of work and hourly wages), each of which by itself has been of interest to evaluators of vocational training programs.

Finally, the author utilizes a more disaggregated and more informative measure of the amount of vocational training received by sample members while enrolled in high school. Using data on course work from high school transcripts of students, Meyer constructs measures of the percentage of total course work in the vocational area and in particular types of training fields (trades and industry, commercial, agriculture, business and office). The analysis is thus designed to ascertain whether students who spent higher percentages of their course work in vocational fields as opposed to academic and other non-vocational courses obtained superior employment and/or earnings records in the first eight years following graduation from high school. The findings being reported are based upon that sample of 1972 high school graduates who did not complete any additional schooling.

The major findings of the analysis can be summarized in the following manner. First, higher percentages of course work in vocational fields do not significantly increase weeks of employment among males during the first eight years following graduation from high school. Such course work, primarily in the trades and industry field, does tend to significantly raise the weekly wages of males during several of the early years following graduation. During the first seven years after graduation, those young males who spent a "substantial" share of their course work in the trades and industry area received real earnings (in present value terms) approximately 3.3% higher than their male counterparts with little or no such training.[21] Males with substantial shares of course work in the commercial field earned only 1% more over the first seven years of the post-high school period.

Second, as was true of the Grasso/Shea findings, women who were enrolled in business and office courses for a substantial share of time in high school experienced significant gains in annual hours of work, hourly wages, and annual incomes for most of the first six years following graduation from high school. The sizes of the annual income gains typically fell in the $500-600 range. For all women who spent a substantial share of course work in the business/office occupational programs, the present value of the total annual earnings over the first seven years after graduation were 16% higher than comparable individuals without such training. The relative size of the annual income gains for women in such training courses was far greater than that for men with substantial exposure to vocational training in high school. As noted earlier, these diffential income effects between men and women enrolled in vocational courses are largely reflective of the more general nature of the training provided to women in the business/office courses, its direct and immediate relevance to job performance in major segments of the clerical and sales occupational structure, and the closer links between such programs and the private sector.

Meyer's analysis also provides further evidence of the importance of intensive in-school employment experience for later labor market success. Men and women who worked twenty or more hours per week in

high school experienced significantly higher weekly earnings and worked more weeks during the first seven years following graduation from high school. Standard achievement test scores also significantly affected weekly earnings and hours of work during the first seven years of the post-high school period, with the impacts more consistently positive and larger for women.

The last two studies being reviewed are based upon the findings of the new National Longitudinal Survey of Youth Labor Force Behavior that began operations in 1979 with a sample of approximately 12,500 youth 14-22 years of age. The sample is basically a nationally representative sample of all youth in the 14-22 age group; however, oversampling did occur among minority and poor youth subgroups whose employment problems have been the target of most national employment and training programs.[22] This data base possesses one major advantage over the others used in the preceding studies in that it provides more current information on the post-high school labor market experiences of recent graduates of vocational education programs.

The first of these final two studies was completed by Daymont and Rumberger.[23] Their analysis is focused on the labor market outcomes of young men and women who were 17-21 years of age in the winter of 1980 and who were not enrolled in school full-time at the time of the 1980 interview. They key labor market outcomes examined by the authors were weeks of unemployment, hours worked per year and hourly earnings on the current job. Similar to the Meyer approach described above, the authors examined the high school transcripts of these students to determine the total number of credits they received, the general subject area in which these credits were earned (academic, vocational, other), the extent to which vocational credits were taken as part of a structured vocational education program, and the degree to which credits were used in an actual job setting upon leaving high school. As we noted earlier, vocational courses in high school may only improve the employability of these enrollees if the skills imparted are actually utilized on the job.

The major findings of the Daymont/Rumberger study can be summarized in the following manner. First, both academic and vocational credits favorably influence the post-high school labor market outcomes for young persons, with the size of impacts of these two types of course credits frequently being similar in size, especially for women. Courses outside of the academic and vocational areas seldom improve one's later employability or earnings. Unfortunately, these latter types of courses accounting for 26% of the total course work of former students in the sample have become increasingly dominant in the curriculum of high schools over the years.[24]

Second, among males, vocational education credits taken as part of a formal program of instruction tended to have a greater impact than credits not taken as part of a program for two of the three labor market outcomes (weeks of unemployment and hourly earnings). For women, the impacts of the two types of vocational credits were quite similar. As was true for several of the previous studies reviewed in this paper, training in business and office occupations tended to generate the highest employment effects for women.

Third, for both men and women, vocational credits used on the job tend to payoff more frequently and by larger amounts than vocational credits not used on a current job. For two of the three labor market outcomes for men and women, vocational credits not used on the job failed to generate any positive significant effect. For both men and women, the use of vocational credits generated greater impacts of hours of employment than academic credits. These findings again indicate the importance of closely tying the nature of vocational training provided to the actual structure of available job opportunities at the state and local level. Economic returns from vocational education appear to be critically influenced by the use of the training received in an actual job setting.

The final study being reviewed is a recently completed study by Gardner, Campbell and Seitz.[25] The primary purpose of the study undertaken for the U.S. Department of Education's Office of Vocational and Adult Education was to estimate the impacts of alternative intensities and types of vocational education in the high school upon the labor market success of young people in the early school leaving years. As was the case for the Daymont/Rumberger study, the analysis is based on data from the new National Longitudinal Survey of Young Americans. The study is focused upon those young men and women who had completed at least twelve years of schooling by the time of the 1980 survey round.

The authors attempt to estimate the impact of vocational education at the secondary level upon a series of labor market outcomes, including hours of work, hourly and weekly wages, and annual incomes. Unlike the previous studies, this report examines separately the direct and the indirect effects of vocational education upon the hourly and weekly earnings of young adults. Indirect effects of vocational education upon hourly earnings include such effects as access to unionized jobs, employment in different industries, job tenure and overall employment experience. The authors devote considerable attention to the selection of appropriate labor market outcome measures. They contend that average hourly earnings by itself may be an inappropriate, if not misleading, indicator of the effectiveness of vocational education programs. Vocational education concentrators may earn higher annual incomes than those young persons without any vocational education, but not necessarily earn higher hourly wages. Vocational education concentrators may accept stable jobs offering more hours and weeks of employment during the year at the expense of somewhat lower hourly earnings.

The authors used the high school transcripts of these former students not only to classify them according to different types of curricula, but also to categorize them into three different categories of vocational training based on their degree of involvement in such courses and the structure of the courses taken. These three categories are vocational education concentrators, vocational education concentrator/explorers who take courses in several different occupational areas, and limited vocational education students. The post-high school labor market experiences of each of these three groups are compared with those of other high school graduates who took no vocational course offerings in high school.

Among the major findings of this study were the following. First, male and female vocational education concentrators tended to earn higher annual incomes than high school graduates who did not receive any vocational training in high school. The size of the unadjusted annual income effects were $1,000-$2,000 for male vocational education concentrators and $500-$1,500 for female vocational education concentrators.[26] A portion of the income advantage for both groups, particularly for males, was due to their lower likelihood of being enrolled in a post-secondary school. Second, all of the estimated annual income gains for male concentrators occurred as a result of a greater number of weeks and hours of employment during the year rather than to higher hourly earnings. In fact, male vocational education concentrators earned 10% lower average hourly earnings than their counterparts who received no vocational training in high school. Of this total wage effect, nearly 40% was attributable to the reduced access of male vocational concentrators to unionized jobs, which pay higher wages. It is not clear, however, whether male vocational concentrators voluntarily choose to work more often in smaller, non-unionized establishments that offer more stable work or whether they lack the informal contacts in unionized establishments that are often so critical to the hiring process.

Third, female vocational graduates obtain higher annual incomes through a combination of both higher hourly wages and increased weeks of employment during the year. The relative size of the average hourly earnings advantages (16%) of female vocational education concentrators was quite high. Smaller, but positive, average hourly earnings advantages existed for women with a limited degree of concentration in vocational education programs. Unlike males, female vocational education graduates gained access to unionized establishments at rates higher than those of women not receiving vocational education in high school.

Employer Benefits from Vocational Training

The provision of vocational training may generate benefits to groups in society other than the trainees themselves; thus, sole concentration on the employment, wage, and earnings effects of vocational training may underestimate total benefits. The other groups that potentially stand to benefit from the public funding of vocational training programs include the following:

(a) Employers of vocational training program graduates. The benefits to employers may occur in the form of reduced training costs and higher productivity levels of vocational training program graduates in excess of any wage differentials that they are paid for their productivity;

(b) Workers employed in occupations that are complementary to the jobs held by vocational training program graduates. To the extent that vocational training programs reduce the overall costs of employing workers in occupations related to the specific nature of the training provided, they also will raise the demand for workers in occupations that are complementary to those held by vocational training graduates. This should result in either an increase in the wages of such complementary workers and/or a rise in the number of such workers hired by the firm;

(c) Consumers of the goods and services that are produced by the firms hiring vocational training program graduates. If vocational programs do succeed in either reducing the training costs of employers or raising the productivity of vocational graduates in excess of the wages paid to them, then the unit labor costs of firms hiring such workers will be reduced. Depending on the degree of competition in product markets, a portion of these unit labor cost savings will be passed on to consumers in the form of lower prices for goods and services produced by vocational program graduates.

While vocational training programs can theoretically produce benefits for employers, other workers and consumers, there have been few systematic efforts to identify and measure the extent of such benefits. In recent years, state vocational education agencies have been required to conduct sample surveys of employers of graduates who were identified as being employed at the time of the one-year participant follow-up survey. The questionnaires used to collect such information, however, were designed to obtain only qualitative impressions of the comparative work performance and work habits of vocational training program graduates and not quantitative estimates of their actual productivity and training costs.[28] Many of these employer follow-up efforts appear to have been undertaken sporadically, if at all, and to have suffered from serious non-response problems and reporting biases.

During the past year, however, the National Center for Research in Vocational Education published a study on employer perceptions of the benefits received from hiring vocational training graduates.[29] This study involved interviews with a national sample of approximately 3,850 employers during the spring and summer of 1982.[30] Employers were asked to provide information on the training costs, productivity, and wages of a sample of nearly 3,500 newly hired workers. This sample provided estimates of comparative training costs and productivity ratings (scale of 0 to 100) of new hires occupying similar jobs, with and without prior vocational training. The findings of this sample survey were used to estimate the extent to which the hiring of workers with school-provided vocational training reduced the training costs of employers and improved the productivity of these employees relative to workers in similar jobs without such training.

The results of the study suggest that newly-hired workers with in-school vocational training backgrounds that were related to jobs for which they were hired were less costly to train relative to new hires without such training. The key finding here is that these lower training costs occurred only if the prior vocational training was related to the job in question. The estimated size of these training cost reduction were the following:

(i) 20% less formal training;

(ii) 10% less informal training by managers and supervisors of newly-hired workers;

(iii) 4 % less informal training by their co-workers.

New hires with relevant vocational training were also considered to be more productive in the same jobs than new hires who lacked such training. Their productivity was estimated to be 9% higher in the first two weeks of employment, 6.5% higher in the next ten weeks, and 6.5% higher over the next six to thirty-three months. New hires with relevant vocational training also received higher hourly wages; however, the size of these wage differences were less than the reported productivity differences. Wage rates of vocational program graduates were from 1.2 to 3.6% higher than those of new hires lacking such training. On average, the net gain to employers from hiring vocational graduates as measured by the difference between productivity and wage differentials was approximately 3 to 3.5%. The size of these gains appeared to be larger for male employees occupying blue collar jobs than white collar jobs. The higher productivity from vocational training appears to be split between employer and employee in these latter occupations. This is not totally surprising from a theoretical standpoint since more of these skills are "job specific" and the returns from job specific skills can be expected to be shared somewhat by employers and workers.[31] The authors of the report concluded that firms hiring new employees possessing relevant school-provided vocational training received net benefits equal to approximately 5% of the new hire's wages during the first three months of employment. These net benefits to employers need to be taken into consideration in evaluating the social efficiency of public investments in vocational training.

Summary of Key Findings and Their Policy Implications

This paper has provided a review of a key number of recent empirical studies of the impacts of vocational training programs at the secondary level on the post-program labor force, employment, and earnings experiences of participants. Nearly all of these studies were national in scope and were based on the findings of a number of longitudinal surveys that track the labor market experiences of a representative sample of youth over time. At this point, it would seem desirable to summarize the major findings of our literature review and discuss their implications for the future planning, design, administration and evaluation of vocational training programs at the secondary level in the United States.

First, one of the most recent evaluations of the impacts of alternative types of course work on the post-high school employment and earnings of young adults revealed that academic courses and vocational courses in high school tended to produce similarly-sized impacts for both men and women. This finding by itself suggests that no empirical case can be made for radically shifting the nature of the existing course work toward either the academic or the vocational area. As noted earlier, however, the non-academic, non-vocational courses appear to have no favorable impact on the early work experiences of young adults who do not go on to college. Unfortunately, these courses have tended to proliferate in the past decade and have accounted for a rising share of all courses taken by high school students. A reduction in the latter type of courses would appear to be called for since they appear to have been partly responsible for the decline in national test

scores of high school students throughout the nation during the past decade and have failed to generate any early labor market payoff to young adults.[32]

At the same time, however, recent evidence also suggests that those high school students who particpated in intensive or structured vocational education programs tended to benefit substantially from such training. Those students who received low to moderate doses of vocational training and those who tended to elect courses in a number of individual fields rather than concentrate in one field received little or no benefits from such courses either in terms of employment or weekly/annual earnings. The "casual" vocational education student, thus, does not appear to have improved his/her opportunities for early success in the labor market.

This latter finding calls into serious question the proposals put forth in recent years by several groups for major reform of the vocational education system at the secondary level, including the Paideia Group and the Carnegie Foundation for the Advancement of Teaching.[33] The proposals advanced by the above groups would eliminate separate vocational tracks from the existing high school curriculum. Instead, all students would be exposed to a certain amount of manual training, career information, and world of work training not specifically targeted upon any one single occupation or occupational cluster. Yet, exposure to such types of courses unaccompanied by intensive job development and placement support by school staff has not been found to favorably affect the early post-high school employment experiences of students.

Rather than eliminate the vocational curriculum from the high schools, it might be more appropriate to consider limiting the total number of students enrolled in vocational courses, increasing the number of vocational students taking a structured series of courses in an occupational cluster, bolstering the academic training provided to such students, providing on-going remediation services for those students deficient in basic academic skills, and strengthening ties between the training provided and the employer community in the local and state economy. These recommendations are clearly not revolutionary. Similar views have been expressed previously by vocational education analysts and evaluators. They are common sense noticns and supported by the findings of recent empirical research. Studies of the effectiveness of SENAI training efforts in Brazil have reached somewhat similar conclusions about the factors contributing to the success of such efforts. The existence of a highly structured training environment, emphasis on work habits and attitudes as well as specific manual or technical skills, and the development of close working relationships with the firms employing the graduates of such programs are believed to be key elements of the training efforts sponsored by SENAI.[34]

Second, future efforts to bolster the effectiveness of vocational education programs at the secondary level must focus on strengthening the basic skills of participants. An increasing number of research studies have revealed that the basic reading, vocabulary, and mathematics skills of high school students in the United States are signifi-

cant determinants of their labor market success as young adults.[35] Those young people who achieved higher scores on achievement tests in the above subject areas tend to be employed more frequently and earn higher annual incomes as young adults. These findings hold true for blacks and whites, for men and women, and for youth from economically disadvantaged families.

Critics of the existing vocational education system have frequently pointed to the limited academic competencies of such students and the constraints that such limited skills place on future educational options.[36] Even supporters of the vocational education system have to recognize the deficiences in the academic skills of students in such programs. Evidence from a 1980 testing of a nationally representative sample of young Americans 15-23 years old reveals that vocational education students had the lowest mean scores on the Armed Forces Qualification Test, a test of word knowledge, reading comprehension, arithmetic reasoning, and numerical operations.[37] Data in Table 1 reveal that the mean AFQT test scores of vocational education students are 2 to 6 points below those of general academic students in the junior and senior years of high school and 14 to 15 points below those of college preparatory students in the junior and senior classes. These latter test score differences are quite high, equivalent to .8 to .9 standard deviations.

The above findings appear to have a number of key implications for the vocational education system in the United States. The academic course work of vocational programs must be strengthened. Related courses must emphasize reading, writing, communications, math and science skills of students. Vocational students with serious academic deficiencies must be encouraged, if not required, to participate in academic remediation programs as part of their school requirements. Vocational education at the secondary level should not be viewed as an "aging vat" for those high school students bored with academic subjects and/or deficient in academic skills. The Congress of the United States has recognized the need for improving the academic competencies of vocational education students in its recent passage of the Carl Perkins Vocational Education Act of 1984.[38] Individualized, self-paced, and competency-based instructional systems have been developed to assist in efforts to strengthen the academic competencies of such students.[39]

The relevance of such findings for the vocational education system of Brazil is not straightforward; however, it does appear that improvements in the nation's educational system will likely be critical to the future success of the vocational training system of Brazil. To gain entry into SENAI training courses, applicants must have completed a minimum of four years of schooling. High percentages of the youth entering primary school (80% in the late 1970's) do not complete four years; thus, the limited formal educational attainment of many young adults in the Brazilian population may serve as a serious constraint on further growth and efficiency of the nation's vocational education system.[40]

The available evidence on the rates of return from SENAI training in selected areas of Brazil is mixed with respect to the relationship between rates of return and the formal educational attainment of participants. The returns to SENAI training are approximately identical (23 to 24%) for those who completed primary school (4-6 years) and those who undertook such training after leaving high school.[41] Both of these rates of return are nearly double those who entered such training after leaving junior high school (12%). It does appear, however, that the types of training by occupational area in which participants were enrolled vary considerbly by years of formal schooling completed. To the extent that the occupational structure of Brazilian employment shifts toward more technical and skilled occupations during the 1980's, the educational attainment and academic ability of its work force will have to keep pace to prevent basic skills deficiencies from limiting the efficiency of future vocational training efforts. Greater integration between the planning of the formal educational system and the vocational education system is likely to be needed as well as experimental efforts to improve the basic academic skills of the unemployed and underemployed adult population to enable them to participate more fully in the entire vocational training efforts of the nation.

Third, available evidence on the employment, productivity, and earnings impacts of vocational education in the U.S. indicate the critical importance of graduates obtaining access to jobs that utilize the skills imparted by the vocational program in which they participated. Even the critics of vocational education recognize the importance of such ties.[42] Recent evidence on the benefits of vocational training for participants and their employers suggests that the efficiency of such investments is critically dependent on the ability of graduates to secure employment in occupational areas related to their training.[44] In the absence of such close relationships, vocational training does not appear to generate net benefits to either participants or employers.

The above findings have important implications for the future planning and design of vocational education programs in the U.S. During the past twenty years, the Congress has provided federal support for vocational education at the secondary and post-secondary level, but has consistently called upon the states to base their planning of such programs upon careful consideration of labor market realities in their states. The development of state labor market and occupational information systems capable of providing information on current and projected employment by occupation has been encouraged, and support for such systems has been renewed in the recent passage of the Carl Perkins Vocational Education Act of 1984.

The ability of vocational education programs at both the secondary and post-secondary level to place their graduates in jobs related to programs at the local level is critically influenced by staff involvement in the placement of graduates and by the closeness of ties between program staff and local employers. Two recent studies have examined the role of institutional factors in influencing the training-related placement rates of vocational education programs at the secondary levels.[44] Among the major findings of these studies

were that higher training-related placements tended to occur in institutions in which the following conditions were observed: administrators, teachers, and counselors recognized the importance of placing graduates in jobs related to their training and were committed to the attainment of such objectives; teachers were actively involved in the job placement of program graduates; and program staff had regular and frequent contact with local employers in their efforts to develop training-related job opportunities for their students. While external labor market conditions during any given year will impose constraints on the ability of vocational programs to secure training-related jobs for their graduates, a shared agreement by local program administrators and staff on the importance of this goal and the fostering of close working ties with the business community can make a substantive difference.

The success of past SENAI training efforts in Brazil appears to have been influenced to a major degree by the close working relationships between employers in the SENAI organization and training programs. In his assessment of the SENAI programs' effectiveness, Castro notes that "his (the SENAI graduate) first job is almost always set up by SENAI itself, which for obvious reasons has better contacts with enterprises that can absorb a large number of its graduates."[45] This brokering function played by SENAI clearly plays a key role in increasing the likelihood that graduates will be placed in jobs that make immediate and effective use of the training they received. Critics of firm specific training have suggested that such training may limit the mobility of graduates. Such does not appear to be the case in Brazil. The SENAI evaluation conducted by Castro indicates that SENAI graduates were actually more occupationally mobile than persons who did not receive such training. This "occupational mobility", however, may be representative of movement along internal career ladders in the manufacturing establishments in which they were initially placed rather then the attainment of completely different occupations in different economic establishments. SENAI training with its emphasis on working as part of an organization, industrial discipline, and pride in one's work may well facilitate the internal mobility of its graduates. Further research on the nature of the occupational and geographic mobility of vocational education graduates in Brazil appears to be needed to provide greater insights on this important issue.

Fourth, substantial evidence with respect to the importance of early work experience for labor market success of young adults in the U.S. has accumulated over the past ten years.[46] Those young persons who work during the high school years, particularly those who hold steady jobs offering more than ten hours of work per week, do achieve superior employment and earnings records in the early adult years. These results appear to hold true for men and women, whites and blacks. The earnings effects from early work experience are found to persist during the first seven to eight years following graduation from high school.

The above findings tend to suggest that vocational education programs at the secondary level could enhance the employability and earnings of participants by providing them with more frequent and intensive

exposure to the labor market during the high school years. Research on this issue has been undertaken by the Center for Labor market Studies during recent months. Selected findings of the National Longitudinal Survey of Youth Labor Force Behavior with respect to the in-school employment experiences of U.S. high school students by curriculum are presented in Tables 1 and 2 on the following pages.[47] The data appearing in Table 1 indicate that, at the time of the 1980 interview, vocational education students in the junior and senior years of high school were somewhat more likely to be employed than their counterparts in the college preparatory and general academic curricula. The absolute sizes of these employment advantages are not, however, very large. During the junior year of high school, vocational education students enjoyed a 2 to 3 percentage point employment advantage over college prep and general academic students. During the senior year, the employment advantage of vocational education students was 3 to 4 percentage points over students in the college prep and general academic programs. Previous analysis of the in-school labor market experiences of high school students throughout the United States during 1979 revealed that, when employed, vocational education students were more likely than their counterparts in other curricula to work a greater number of hours per week. For example, 41.2% of employed vocational education students (grades 10 through 12) worked 21 or more hours per week in comparison to 36.7% of the general academic students and only 26.9% of the college prep students. These more intensive in-school employment experiences have been found to have greater long-term impacts.

Data on the in-school employment status of high school seniors in various curricula by race/ethnic group are presented in Table 3. The data pertain to the actual employment status of these young people at the time of the 1980 NLS interview. The findings reveal that white, non-Hispanics enrolled in a vocational education curriculum experienced only a slight employment advantage (2 percentage points) over their white counterparts in the college prep curriculum and were no more likely to be employed than their counterparts in the general academic program (62.5%). Black non-Hispanics enrolled in a vocational education program during the senior year were 3 percentage points more likely to be employed than black youth in college prep programs and 1 percentage point more likely to be employed than black youths in the general academic track. Black vocational education students in the aggregate, however, were only two-thirds as likely as white vocational education students to be employed at the time of the 1980 survey. The substantial difference between the employment rates of these two groups was largely influenced by the much higher unemployment rate encountered by black vocational education students at the time of the survey (27.6% vs. 17.6%). The in-school employment problems of black vocational education students are due to a variety of factors, including more depressed labor market conditions in the inner-city communities in which they live, the shift in the location of many blue collar jobs to suburban communities relatively distant form the homes of these students, and fewer opportunities for them to participate in cooperative vocational programs in their high schools.

The above findings on the recent in-school employment experiences of vocational education students in the U.S. suggest a need for increasing the access of vocational education students to the job market while still enrolled in high school. The need is particularly acute for black students, whose employment rates are 30 to 40% below those of white vocational education students. Supporters of the public vocational education system, including the National Commission on Secondary Vocational Education, have also called for expanded field-based learning opportunities for vocational students to enable them to apply their skills in actual work settings in the private sector or in community service projects.[48] An expansion of in-school work programs for vocational students, including cooperative vocational programs during the school year and summer months, would seem to be highly desirable, particularly for economically disadvantaged and minority youth, who lack the informal brokering network for jobs that is available to most middle income white youth.

The implications of these findings for the future design and operations of vocational education programs in Brazil are not as straight-forward. At this point, we do not have empirical evidence of the influence of early work experience on the future labor market success of young adults in Brazil. For example, do students who work while in junior high school, high school, or technical high school achieve superior employment and earnings records as young adults in the labor markets of Brazil? Do SENAI or SENAC trainees with substantive prior employment experience tend to perform better in such training programs and do they fare better in the labor market after completing such training than their counterparts with limited or no prior work experience? Answers to these questions would be valuable in designing employment policies for the in-school population of Brazil.

Findings of Moura Castro's evaluation of training programs in Brazil revealed the returns from technical training in high school to be well below average in Sao Paulo though quite favorable in Rio de Janiero.[49] Speculation on reasons for such relatively low returns in Sao Paulo has centered on limited demand for workers trained in such technical fields. Increased linkages between training programs in such technical high schools and the local employer community, including the development of cooperative education programs to provide job related work experience, may well be called for to improve the efficiency of future training investments in these schools.

Finally, the future success of vocational education programs in the U.S. will depend not only on the ability of vocational education schools to provide training in occupational areas in demand in the labor markets of the nation and to improve the basic skills and vocational aptitudes of their students, but also on the willingness and ability of employers to hire and train recent graduates of such programs. Findings of previous studies have revealed that many employers in career labor markets, particularly in unionized establishments, are reluctant to hire young, recent high school graduates, particularly from vocational education programs.[50] Recent evidence on trends in youth labor markets compiled by this author have revealed that youths (16-19) throughout the country appear to have become increas-

ingly isolated in traditional youth labor market jobs in the retail trade and private services sectors of the economy.[51] More than 80% of all employed teens work in these two sectors.

As a result of both high levels of unemployment among the entire labor force and the recent bulge in the number of 22-34 year olds actively participating in the labor force, many of whom are prime candidates for primary sector jobs, youth appear to have been pushed further back in the hiring queues of many firms. Simultaneously, youth appear to have been practically excluded from hiring consideration in most goods-producing sectors of the economy, which contain the bulk of the blue collar occupations relevant to key segments of vocational education training. Another on-going study by the Center for Labor Market Studies suggests that the share of 18-22 year olds occupying primary jobs in American labor markets has been falling over time.[52] It is precisely these jobs in which education, training, and experience have the highest economic payoffs. Continued confinement of young persons to the secondary labor market will arbitrarily reduce the returns to vocational training in the future.

In assessing the impacts of vocational education programs, one must recognize that the returns on such investments have been and will be critically influenced by the hiring and training practices of private and public sector employers. An unwillingness to hire younger applicants, including recent high school graduates with vocational training, will tarnish the image of such programs in the eyes of former and current students in the high schools of the nation. An increased emphasis must be placed on strengthening formal relationships between vocational training programs and local employers.[53] Such efforts must include employer inputs into the design of appropriate curriculum and the specification of skills desired of new employees. At the same time, schools must certify students' attainment of such competencies. As noted above, employers must also extend their involvement with in-school employment programs and attempt to open up additional opportunities to younger applicants with requisite skills for entry level positions. A great deal of local institution building needs to be carried out by the public vocational education system to improve the long-term performance of the system. Expanded federal and state support for purchases of materials, machinery, and equipment, including mini-computers for teaching vocational and academic skills, teacher upgrading programs, and expansion of cooperative vocational programs will be needed as well.[54]

The importance of such institutional linkages for the success of past SENAI training efforts in Brazil has been noted in our prior discussions. As Moura Castro noted in his evaluation study:

> Demands for expansion in SENAI enrollment do not come from the working class itself but from the firms that use SENAI-trained manpower. And indeed, being supported and indirectly administered by an employers' organization, SENAI has close ties with and is very responsive to the manufacturing firms that hire its graduates.[55]

The demands for vocationally-trained manpower in Brazil during the remainder of this decade will be heavily dependent upon the overall growth and development of the Brazilian economy. Simultaneously, the ability of the human resources of Brazil to contribute to the future development and growth of the economy will be dependent upon the level and efficiency with which national resources are devoted to the education and training of the nation's citizenry. As the late Frederick Harbison so aptly noted, "human resources - not capital, nor income, nor material resources - constitute the ultimate basis for the wealth of nations."[56] A carefully planned, efficiently administered, and closely evaluated vocational education system should play a key role in the overall human resource development system of Brazil during the remainder of this decade and contribute to the attainment of key economic and social goals for the nation.

Table 1: Mean Scores of U.S. High School Students on the AFQT Test, by Year in Which Enrolled and Type of High School Curriculum, 1980

	High School Curriculum			
	(A)	(B)	(C)	(D)
Year in Which Enrolled	Vocational	Commercial	College Prep	General Academic
Sophomore	54.7	58.1	74.3	64.1
Junior	61.5	67.4	76.6	68.1
Senior	67.6	72.7	81.7	69.3

Source: Unpublished data produced by the Center for Labor Market Studies of Northeastern University from the 1981 public use tapes of the National Longitudinal Survey of Youth Labor Force Behavior.

Table 2: Percent of U.S. High School Students Employed in Winter of 1980, by Year in Which Enrolled and Type of High School Curriculum (in %)

Year in Which Enrolled	High School Curriculum (A) Vocational	(B) Commercial	(C) College Prep	(D) General Academic
Sophomore	27.7	24.7	28.4	27.3
Junior	47.8	60.4	45.9	44.7
Senior	60.5	51.8	56.4	56.8

Table 3: Percent of U.S. High School Seniors Employed in Winter of 1980, by Type of High School Curriculum and Race/Ethnic Group (in %)

	High School Curriculum			
	(A)	(B)	(C)	(D)
Race/ Ethnic Group	Vocational	Commercial	College Prep	General Academic
White, non-Hispanic	62.5	55.1	60.5	62.5
Black, non-Hispanic	42.9	24.6	40.0	32.9
Hispanic	71.6	40.8	34.0	37.6

NOTES

1. Oscar Handlin and Mary F. Handlin, Facing Life: Youth and the Family in American History, Little Brown, and Company, Boston 1971; Ernest L. Boyer., High School: A Report on Secondary Education in America, Harper and Row Publishers, New York, 1983.

2. Michael B. Katz., The Irony of Early School Reform, Beacon Press, Boston, 1968.

3. Grant Venn., Man, Education, and Work: Postsecondary Vocational and Technical Education, American Council on Education, Washington, D.C., 1964.

4. Mortimer J. Adler., The Paideia Proposal: An Educational Manifesto, Macmillian Publishing Co., New York, 1982; Ernest L. Boyer., op. cit.; National Academy of Sciences, Committee on Science, Engineering and Public Policy, High Schools and the Changing Workplace, Washington, D.C., 1984.

5. Mortimer J. Adler., op. cit., pp. 17, 7.

6. Ernest L. Boyer., op. cit.

7. For similar views on this subject, see: National Council for Employment Policy, An Employment and Training Program for the Rest of the Decade, Washington, D.C., 1984; Wellford Wilms, "The Limited Utility of Vocational Education: California Employers' Views," Public Affairs Report, Institute of Government Studies, University of California, Berkeley, August 1983.

8. National Commission for Employment Policy, The Federal Role in Vocational Education, Washington, D.C., 1981; Susan W. Sherman., Education for Tomorrow's Jobs, National Academy Press, Washington, D.C., 1983.

9. National Commission on Secondary Vocational Education, The Unfinished Agenda, National Center for Research in Vocational Education, Columbus, 1984; Gene Bottoms, "Building on Our Strengths," Vocational Education, March 1982, pp. 10-11.

10. For a review of the conceptual and methodological issues involved in evaluating the labor market impacts of vocational education, see:

John T. Grasso and John R. Shea., Vocational Education and Training: Impact on Youth, Carnegie Council on Policy Studies in Higher Education, Berkeley, 1979; Robert E. Taylor and Howard Rosen (Editors); Job Training for Youth, National Center for Research in Vocational Education, Columbus, 1982; Irwin Herrnstadt; Morris Horowitz; and Andrew Sum.; The Transition from School to Work, Youth Knowledge Development Report, 2-16,

U.S. Government Printing Office, Washington, D.C., 1979.

11. For a review of the purposes of these longitudinal survey efforts and their technical design features,

Herbert A. Parnes., "The National Longitudinal Surveys: An Interim Assessment," in Manpower Research and Labor Economics, (Ed: Gordon I. Swanson and Jon Michaelson), Sage Publications, Beverly Hills, 1979 pp. 277-323; Center for Human Resource Research, Ohio State University, The National Longitudinal Surveys Handbook, Columbus, 1973; J.R. Levinsohn, et. al., National Longitudinal Study Base First, Second and Third Years Follow-up Data File Users Manual, Volumes 1 and 2, National Center for Education Statistics, Washington, D.C., 1980.

12. For a more detailed analysis of experimental and quasi-experimental evaluation methods,

Michael E. Borus., Measuring the Impact of Employment-Related Social Programs, W.E. Upjohn Institute for Employment Research, Kalamazoo, 1979; Charles M. Judd and David A. Kenny., Estimating the Effects of Social Interventions, Cambridge University Press, Cambridge, 1981.

13. Herbert S. Parnes. and Andrew I. Kohen., "Labor Market Experience of Noncollege Youth: A Longitudinal Analysis," in From School to Work: Improving the Transition, U.S. Government Printing Office, Washington, D.C., 1976, pp. 57-88.

14. Socioeconomic status of jobs held was determined in the following manner. Each occupation was assigned a three-digit Census occupational code. Then, each Census occupation was assigned a two-digit score based on the rankings of the Duncan index of socioeconomic status.

15. For a more detailed review of the nature and format of the questions related to education and training histories of respondents, see:

U.S. Department of Labor, Manpower Administration, Career Thresholds: A Longitudinal Study of the Education and Labor Market Experiences of Male Youth, Vol. 1, U.S. Government Printing Office, Washington, D.C., 1970.

16. John A. Gardner et. al., Influences of High School Curriculum on Determinants of Labor Market Experiences, National Center for Research in Vocational Education, The Ohio State University, Columbus, 1982.

17. John T. Grasso and John R. Shea., Vocational Education and Training: Impact on Youth, A Technical Report for the Carnegie Council on Policy Studies in Higher Education, Berkeley, California, 1979.

18. Irwin L. Herrnstadt; Morris A. Horowitz; and Andrew M. Sum.; The Transition from School to Work: The Contribution of Cooperative

Education Programs at the Secondary Level, A Report for the Office of Research and Development, U.S. Department of Labor, Washington, D.C., 1979.

19. Robert H. Meyer and David A. Wise., The Transition from School to Work: The Experiences of Blacks and Whites, National Bureau of Economic Research, Inc., Working Paper No. 1007, October 1982.

20. Robert H. Meyer., "Job Training in the Schools," in Job Training for Youth, (Ed. Robert E. Taylor and Howard Rosen), The National Center for Research in Vocational Education, Columbus, 1982, pp. 307-344.

A more detailed analysis of the subject by the same author appears in the following volume:

Robert H. Meyer., An Economic Analysis of Vocational Education, The Urban Institute, Washington, D.C., 1981.

21. A substantial share of course work implies that the respondent's percentage course work in a given vocational area was two standard deviations above that of the comparison group. Two standard deviations is equivalent to one-third of all courses in high school.

22. Center for Human Resource Research, The National Longitudinal Surveys Handbook, The Ohio State University, Columbus, 1981.

23. Thomas Daymont and Russell Rumberger., "The Impact of High School Curriculum on the Earnings and Employability of Youth," in Job Training for Youth, (Ed. Robert E. Taylor and Howard Rosen), Columbus, pp. 279-305.

A modified version of this study also appears in the following volume:

Michael E. Borus, (Editor), Youth and the Labor Market, W.E. Upjohn Institute for Employment Research, Kalamazoo, 1984.

24. Clifford Adelman, Devaluation, Diffusion and the College Connection: A Study of High School Transcripts, 1964-1981, Report for the National Commission on Excellence in Education, 1983.

25. John A. Gardner; Paul Campbell; and Patricia Seitz.; Influences of High School Curriculum on Determinants of Labor Market Experiences, The National Center for Research in Vocational Education, The Ohio State University, Columbus, October 1982.

26. These differences are based on raw mean incomes unadjusted for differences in their socioeconomic and demographic backgrounds and their academic ability. Regression adjusted results were provided for average hourly earnings, but not for annual incomes in this study.

27. Vocational training programs may also generate non-economic benefits in the form of reduced citizen alienation, reduced criminal activity, reduced public assistance payments, etc. During recent years, a number of evaluation studies, including those of the Job Corps and the Supported Work demonstration programs, have attempted to measure and quantify magnitudes of such non-economic benefits.

Abt Associates, The Noneconomic Impacts of Job Corps U.S. Department of Labor, Employment and Training Administration, R & D Monograph, Washington, D.C., 1978; Charles Mallar, et. al., The Lasting Impacts of Job Corps, Youth Knowledge Development Report, 3.5, U.S. Government Printing Office, Washington, D.C., 1980; Rebecca Maynard and Stanley H. Masters., The Impact of Supported Work on Long-Term Recipients of AFDC Benefits, Manpower Demonstration Research Corporation, New York, February 1981; Peter Kemper and David A. Long., The Supported Work Evaluation: Technical Report on Value of In-Program Output and Costs, Manpower Demonstration Research Corporation, New York, September 1981.

28. For a review of suggested employer followup forms,

National Center for Educational Statistics, The VEDS Forms Handbook, Washington, D.C., 1979.

29. John H. Bishop., The Social Payoff from Occupationally Specific Training: The Employer's Point of View, National Center for Research on Vocational Education, Columbus, Ohio, 1983.

30. The interviews with this sample of employers were completed by the Gallup Organization for the National Center for Research in Vocational Education. The sample of employers had previously participated in a 1980 national study undertaken by the U.S. Department of Labor.

31. For a review of the theoretical distinctions between general training and specific training and the distribution of the costs and benefits of specific training,

Gary Becker., Human Capital, National Bureau of Economic Research, New York, 1962.

32. The decline in test scores of high school students in the vocabulary, reading comprehension, and math areas between 1972 and 1980 occurred in all curriculum areas; however, an increase in the share of students enrolled in general academic programs also contributed to the decline in test scores. Many of these non-academic, non-vocational courses are offered to students in the general academic curriculum.

Donald Rock., et. al., "Seminar on the National Decline in High School Students Performance on Achievement Tests," Educational Testing Service Princeton, December 1984.

33. Mortimer J. Adler., The Paideia Proposal: An Educational Manifesto, pp. 33-34; Ernest L. Boyer, High School: A Report on Secondary Education in America, pp. 126-128.

Similar views on the need to reduce the amount of occupation-specific training in high school have been expressed recently by the National Council on Employment Policy and Wellford Wilms.

The National Council for Employment Policy, An Employment and Training Program for the Rest of the Decade, Washington, D.C., September 1984; Wellford W. Wilms., "The Limited Utility of Vocational Education: California Employers' Views"...34.

34. Claudio de Moura Castro., "Vocational Education and the Training of Industrial Labour in Brazil," International Labor Review, Vol. 118, No. 5, Sept.-Oct. 1979, pp. 617-629.

35. Andrew Sum and Paul Harrington., Educational Attainment, Academic Ability, and the Employability and Earnings of Young Persons: Implications for the Planning and Design of JTPA Youth Programs, Report Prepared for the Ford Foundation, December 1983.

36. Ernest L. Boyer., High School: A Report on Secondary Education in America, pp. 121-126.

37. For further details on the nature of the testing procedures, test instruments, and the characteristics of the sample of youth who participated in this testing effort, see:

Office of the Assistant Secretary of Defense, Profile of American Youth: 1980 Nationwide Administration of the Armed Services Vocational Aptitude Battery, March 1982.

38. 98th U.S. Congress, Carl Perkins Vocational Education Act of 1984, Washington, D.C., October 1984.

Twenty two percent of the basic grant received by each state must be devoted to serve the needs of the disadvantaged, many of whom have severe educational deficiences.

39. Among such systems is the Comprehensive Competencies Program (CCP) developed by the Remediation and Training Institute.

Robert Taggart., The Comprehensive Competencies Program, Remediation and Training Institute, Alexandria, Virginia, 1983.

40. Claudio de Moura Castro., op. cit., p. 624.

41. Ibid., "Table 1," p. 619.

42. Wellford Wilms., op. cit.; Ernest Boyer., op. cit.

43. The evidence on this issue has not been uniform. A 1960's national evaluation of the effects of vocational education at the secondary and post-secondary levels upon the post-program wages and job satisfaction of former students found that train-

ing-related jobs do produce significantly greater job satisfaction, but not higher hourly wages. The determination of the relatedness of jobs held to training received was made subjectively by the respondents rather than by a careful comparison of the occupational titles of jobs held to the occupational area in which training was received.

Gerald G. Somers., The Effectiveness of Vocational and Technical Programs: A National Followup Survey, Center for Studies in Vocational and Technical Education, The University of Wisconsin, Madison, 1971.

An earlier study of the economic returns from training received in the armed forces revealed the critical importance of the use of such training in the civilian economy. Former military personnel who used their training on the jobs they held in the civilian sector were able to reap significant economic rewards from such training while those not applying their military training received no net earnings benefit from such participation.

John Fiedland and Roger Little., "Long Term Returns to Vocational Training: Evidence from Military Sources," Journal of Human Resources, Winter 1980, pp. 49-67.

44. Floyd L. McKinney; Stephen Franchak; Ida Halasz; and Irene Morrison., Factors Relating to the Job Placement of Former Secondary Vocational Education Students and Factors Related to the Job Placement of Former Postsecondary Vocational Education Students, Reports Prepared for the U.S. Department of Education, Office of Vocational and Adult Education, 1982.

45. Claudio de Moura Castro., op. cit., p. 627.

46. For a recent summary of the evidence on this issue,

Andrew Sum., Youth Employment Problems and Their Determinants; Implications for the Design and Administration of the Youth Incentive Employment Act, Paper Prepared for the House Subcommittee on Education and Training, U.S. Congress, May 1984.

47. The curriculum of these students is based on responses provided by them to questions on the survey. The transcripts of these students were not examined to determine the accuracy of their responses on curriculum in which enrolled.

48. National Commission on Secondary Vocational Education, The Unfinished Agenda: The Role of Vocational Education in High School, The National Center for Research in Vocational Education, Columbus, Ohio, 1984.

49. Claudio de Moura Castro, op. cit., pp. 619-621.

50. National Commission for Manpower Policy, From School to Work: Improving the Transition, U.S. Government Printing Office, Washington, D.C., 1976; Paul Osterman, Getting Started: The

Youth Labor Market, The MIT Press, Cambridge, 1980; Robert E. Taylor; Howard Rosen; and Frank C. Pratzner., Job Training for Youth, National Center for Research in Vocational Education, Columbus, 1983.

51. Andrew Sum and Frank Slobig., Current Youth Employment Problems, Policies, and Programs in the United States, Paper Presented to a Tri-National Symposium on the Alleviation of Youth Unemployment, Konrad Adenauer Foundation, St. Augustin, West Germany, October 1984.

52. Paul Harrington and Andrew Sum., Trends in Youth Employment Patterns in the U.S.: The Declining Role of Primary Sector Employment, Center for Labor Market Studies, Northeastern University, Boston, 1984.

53. For a review of recent efforts in the city of Boston to strengthen working relationships between the public high schools and the employer community, see:

Robert Schwartz., The Boston Compact, Paper Prepared for the Symposium on Alleviation of Youth Unemployment, Konrad Adenauer Foundation, Bonn, October 1984; James Caradonio, Vocational Education and Youth Employment, Paper Prepared for the Symposium on Alleviating Youth Unemployment, Konrad Adenauer Foundation, Bonn, October 1984.

54. A more detailed set of recommendations for improvements in these areas was recently advanced by a task force of the National Research Council.

Susan W. Sherman., Education for Tomorrow's Jobs, National Academy Press, Washington, D.C., 1983.

55. Claudio de Moura Castro, op. cit., p. 626.

56. Fredrick H. Harbison., Human Resources as the Wealth of Nations, Oxford University Press, New York, 1973.

Vocational Education in Brazil: Aspects of Economic Policy and Planning

PROGRAM

June 11, Monday

9:00 a.m. — *Welcome*
Solveig M. Turner
Director, CIHED

Opening Remarks
President Kenneth G. Ryder
Dean Richard Astro

A.M. Sessions

Chairman — Morris A. Horowitz, Northeastern University

9:30 Session 1 — *Economic Development and Vocational Training*
Manuel Zymelman, World Bank

10:45 - 11:15 — *Coffee Break*

11:15 Session 2 — *The Political Economy of Labor Market Policy*
Peter Doeringer, Boston University

12:30 - 2:00 — *Lunch*

P.M. Sessions

Chairman — Gustav Schachter, Northeastern University

2:15 Session 3 — *Development Strategies for the 1980s in Brazil*
Peter Knight, World Bank

3:30 - 3:45 — *Coffee Break*

3:45 Session 4 — *Vocational Education Organization in Brazil*
Morris A. Horowitz, Northeastern University

5:00 — *Cocktail Party and Concert by the Northeastern University Early Music Players*

June 12, Tuesday

A.M. Sessions

Chairman — Roberto Regnier Neto, SENAC, Brazil

9:00 Session 5 — *Evaluation of Vocational Programs in the USA*
Andrew Sum, Northeastern University

10:15 - 10:45 — *Coffee Break*

10:45 Session 6 — *Evaluation of Vocational Programs in Brazil*
Antonio Ferreira de Andrade, Francisco Abreu, Eloysio R. da Silva, SENAI, Brazil

12:15 - 2:00 — *Lunch*

P.M. Sessions

Chairman — Andrew Sum, Northeastern University

2:00 Session 7 — *Some Statistical Interpretation of Vocational Training in Brazil*
Paul Ammann, Ministry of Labor, Brazil; Manyee Hong, Gustav Schachter, Northeastern University

3:15 - 3:45 — *Coffee Break*

3:45 Session 8 — *Vocational Education in the Commercial and Services Sector in Brazil*
Nassim Mehedff, Inter-American Development Bank, Roberto Regnier Neto, SENAC Brazil

5:15 — *Closing Remarks*
Gustav Schachter